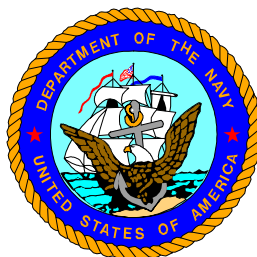


# Joint Gulf Range Complex Strategic Plan

*“Supporting the  
21st Century Warfighter”*





**DEPARTMENT OF THE AIR FORCE**  
HEADQUARTERS AIR ARMAMENT CENTER (AFMC)  
EGLIN AIR FORCE BASE, FLORIDA


Thank you for taking the time to review the **Joint Gulf Range Complex Strategic Plan - "Supporting the 21st Century Warfighter."** The Gulf Range Complex is recognized as having special capabilities for our national defense infrastructure supporting both testing and training. To prepare for the future, the Air Armament Center led a yearlong effort identifying future DoD user needs. This plan reflects the joint vision of not only the Air Armament Center, as the steward of the Gulf Range, but the multitude of local users that compose the Complex, as well as users from around the nation and the world.

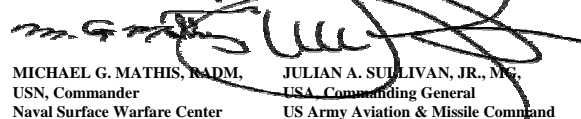
This plan responds to post Cold War changes in our nation's policies and DoD direction delineated in Joint Vision 2020, calling for full spectrum dominance supported by joint seamless operation. While responding to these changes, the plan capitalizes on the unique features of the Gulf Range Complex - expansive over water and overland special use airspace, land contiguous to the Gulf of Mexico, and world class DoD test and training ranges. Numerous Navy, Air Force and Army military installations, representing a cross section of DoD capabilities from individual units to Major Commands, provide a wealth of intellectual capital in the DoD and contractor staff. The regional populace and government are very supportive of the Gulf Range Complex while it is growing dramatically around the Gulf of Mexico. The three goals identified in the plan respond to the user requirements while maximizing the potential of the natural and military assets in the region and recognizing the regional context.

The future of the Gulf Range Complex to meet **users' needs** (Goal 1) was documented by joint user teams into five planning areas they determined the Complex can best support in the 21st Century - Armament, C2ISR, Special Warfare, Multispectral, Littoral. Gulf Complex development objectives then helped structure needs into six strategic and four integration foci.

The need for **joint planning** (Goal 2) is focused on the establishment of a joint consortium to guide the Complex development planning, development execution, and operational management. The Air Armament Center recognizes its key role as the DoD steward of the Gulf airspace and key overland airspace with land assets. It also recognizes the full potential of the Gulf Range Complex to support DoD can only be attained by full jointness in all aspects of the Complex. All users need to feel that they are full partners for mutual benefit. Nothing less is the goal of this plan - a Joint Gulf Range Complex.

The need for a **regional perspective** (Goal 3) is recognized as integral to the future of the Joint Gulf Range Complex. Complex partners must ensure they are sensitive to the development plans of the region while continually communicating to local, state and regional entities the vital missions being performed. Complex development plans will be fully coordinated with regional plans to ensure they mutually support one another.

  
MICHAEL C. KOSTELNIK, Maj Gen,  
USAF, Commander  
Air Armament Center

  
MICHAEL G. MATHIS, RADM,  
USN, Commander  
Naval Surface Warfare Center

  
JULIAN A. SULLIVAN, JR., MG,  
USA, Commanding General  
US Army Aviation & Missile Command



**Major General Michael C. Kostelnik**  
Commander  
Air Armament Center



**Rear Admiral Michael G. Mathis**  
Commander  
Naval Surface Warfare Center



**Major General Julian A. Sullivan, Jr.**  
Commanding General  
US Army Aviation & Missile Command



# Vision



**A world class  
test and training complex  
which enables  
Warfighters  
for the 21st Century**



# Contents

THE COMPLEX

THE VISION

THE STRATEGY

**The Challenge** 2

**The Complex** 4

Mission 6

Partners 8

Region 10

**The Vision**

Policy 12

Drivers 14

Complex Goals 16

Testing Objectives 18

Training Objectives 20

**The Strategy**

Planning Areas 22

Armament 24

C2ISR 28

Special Warfare 32

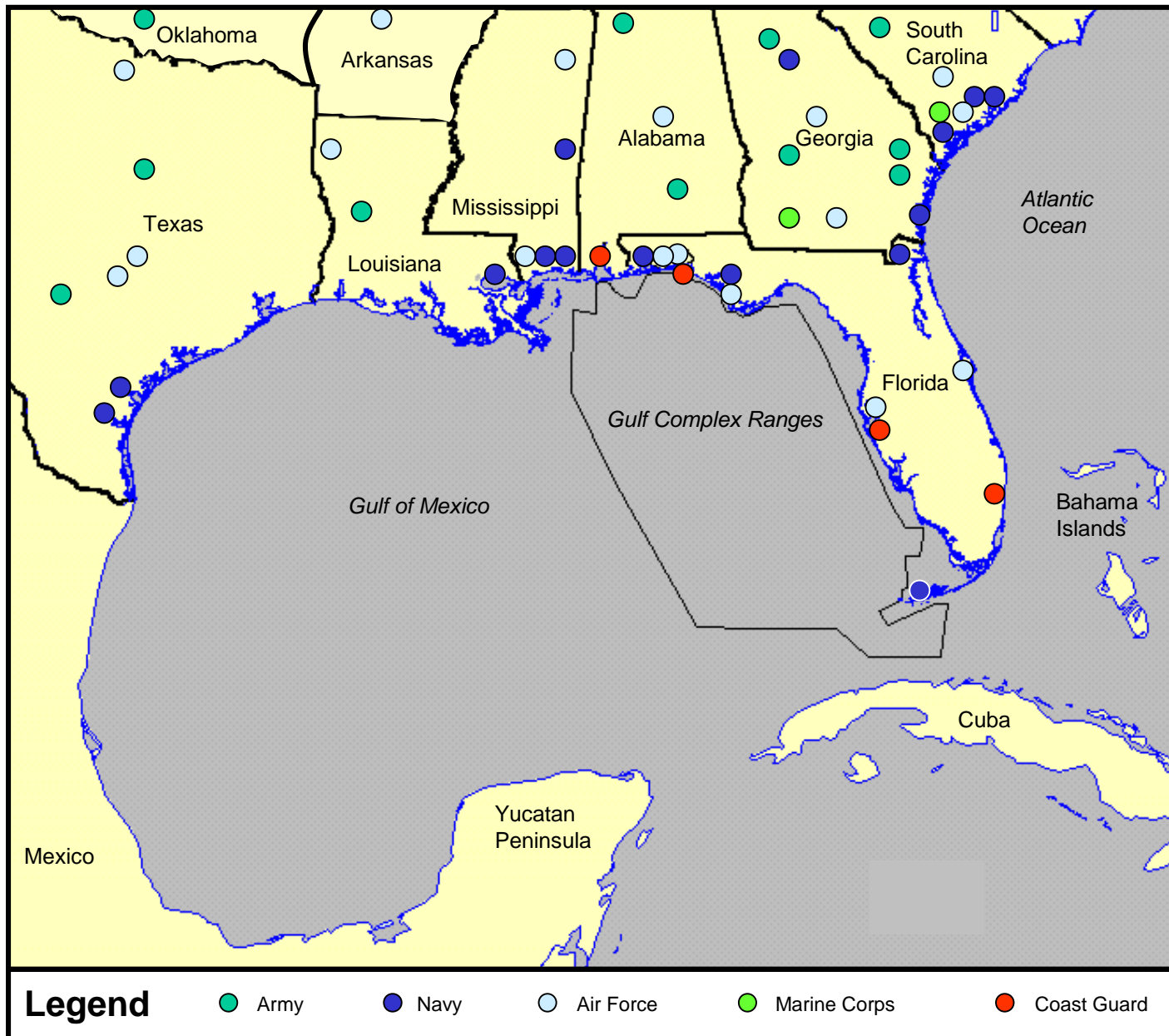
Multispectral 36

Littoral 40

Integration 44

Organization 50

Implementation 52



# The Challenge

## Unique Range

The Gulf Range Complex is a unique national resource of the DoD. It stretches from the Florida Panhandle south to Key West and encompasses the eastern Gulf of Mexico. Surrounding it are numerous DoD installations, ranges and special use airspace that make the Complex one of a kind in the DoD.

The Complex has served the Nation for over sixty years. It started as a place to practice air-to-air engagements, air-to-surface bombing, and strafing. After WW II, it was also used to test surface-to-air rockets against drones. The Complex has stood the test of time and adapted to numerous changes. Today it is extensively used for testing and training, as well as exercises and experiments.

The keys to the Gulf Range Complex are and continue to be its special assets:

- 200 x 400 miles of special airspace use over the Gulf with minimal air and surface traffic
- 20 x 40 miles of contiguous land range with restricted air space
- Low radio frequency background
- Littoral area from deep water to 17 miles of beach with a multitude of bayous, bays, and rivers
- Gulf characteristics similar to Persian Gulf temperature, salinity, clarity and bottom
- Numerous Army, Navy, Air Force, and Marine installations with units that leverage their proximity to the Complex

## DoD Change

The Department of Defense is undergoing a revolution in responding to the post Cold War new world order. Full spectrum warfare dominance is now required by a home-based expeditionary force.

Dynamic change is accelerating and altering the nature of war. **Enhanced jointness** of operations is critical with a smaller defense force to leverage resources against an increasingly wider range of threats and varying levels of intensity. **Sophisticated adversaries** are unpredictable and are employing new technology. **Technology advances** are rapidly transforming the world. Weapon systems are more lethal and precise instruments with dramatically increased logistical sustainability. The **information revolution** the world is undergoing is dramatically impacting the nature of warfare with unparalleled connectivity between sensor, shooter and leadership. Military operations now must be integrated **multinational operations** to deal with the new world order.

**Joint Vision 2020** captures this wave of the future and sets a course to ride it by focusing on four operational concepts - **Dominant Maneuver, Precision Engagement, Full-dimensional Protection, and Focused Logistics**. The basis for this framework is found in the improved command, control, and intelligence which can be assured by **information superiority**.

## Test and Training

Traditional approaches to DoD's business are undergoing not just change but rapid transformation, which the Gulf Range Complex is preparing for through this plan.

**Testing:** The business of testing weapon systems is more in the hands of the developing contractor, with the government starting operational testing at an earlier phase with an emphasis on operational realism. Modeling and simulation continues to mature and supplant some open-air testing, but still requires open air testing to verify models. Hybrid testing of both real and simulated systems is gaining in utilization. Experimentation as a mechanism to rapidly evaluate new technologies, and tactics is becoming an integral part of the testing continuum.

**Training:** The variety of training required by our forces is dramatically expanding with an increased emphasis on full spectrum warfare and joint operations. The nature of training is changing from dropping a bomb or firing a missile to the employment of multiple forces against realistic threats that challenge the participants to employ creative tactics and weapon employment for surgical effect.

Because of the increased complexity of weapons and operations, common data collection requirements for testing and training is emerging.

How should it be used in the future?

Dealing with accelerating change?

Accommodate increasing requirements ?

## Range Vision

**“A world class test and training complex which enables Warfighters for the 21st Century”**

This is a vision of jointness in use of the Gulf Range Complex. It recognizes the unique air, water, and land aspects of the Complex and the synergism that can be obtained by joint planning for the future. All partners involved developed their portion of the future plans. The future is in the hands of the partners and their mutual commitment to realize the joint potential of the Gulf Range Complex.

**How to support 21st Century Warfighter?**

## Range Strategies

The users of the Complex have been working in partnership to realize its full potential. They have jointly developed this plan to portray where the Complex is today, what their vision is for the future, and the strategies to attain the mission.

**Planning Area Strategies** frame the technical aspects of the Complex's future capabilities:

- **Armament**
- **C2ISR**
- **Special Warfare**
- **Multispectral**
- **Littoral**

**Management Structure Strategies** will integrate the activities of the multitude of parties to ensure a coordinated development of the Gulf Range Complex.

- **General Officer Steering Group** annually meets to assess the state of plan accomplishment and to make necessary course corrections.
- **Commanders Council** semiannually meets to review working group progress in executing strategies.
- **Working Groups** for ten strategic thrusts areas guide strategic development and integration.

**How to organize for the future?**

*“The Gulf Range Complex is a DoD treasure today.*

*How should it be used for maximum advantage in the future?*

*This is what the plan is all about.”*

*Colonel David J. Eichhorn  
Commander  
46th Test Wing*

# The Complex

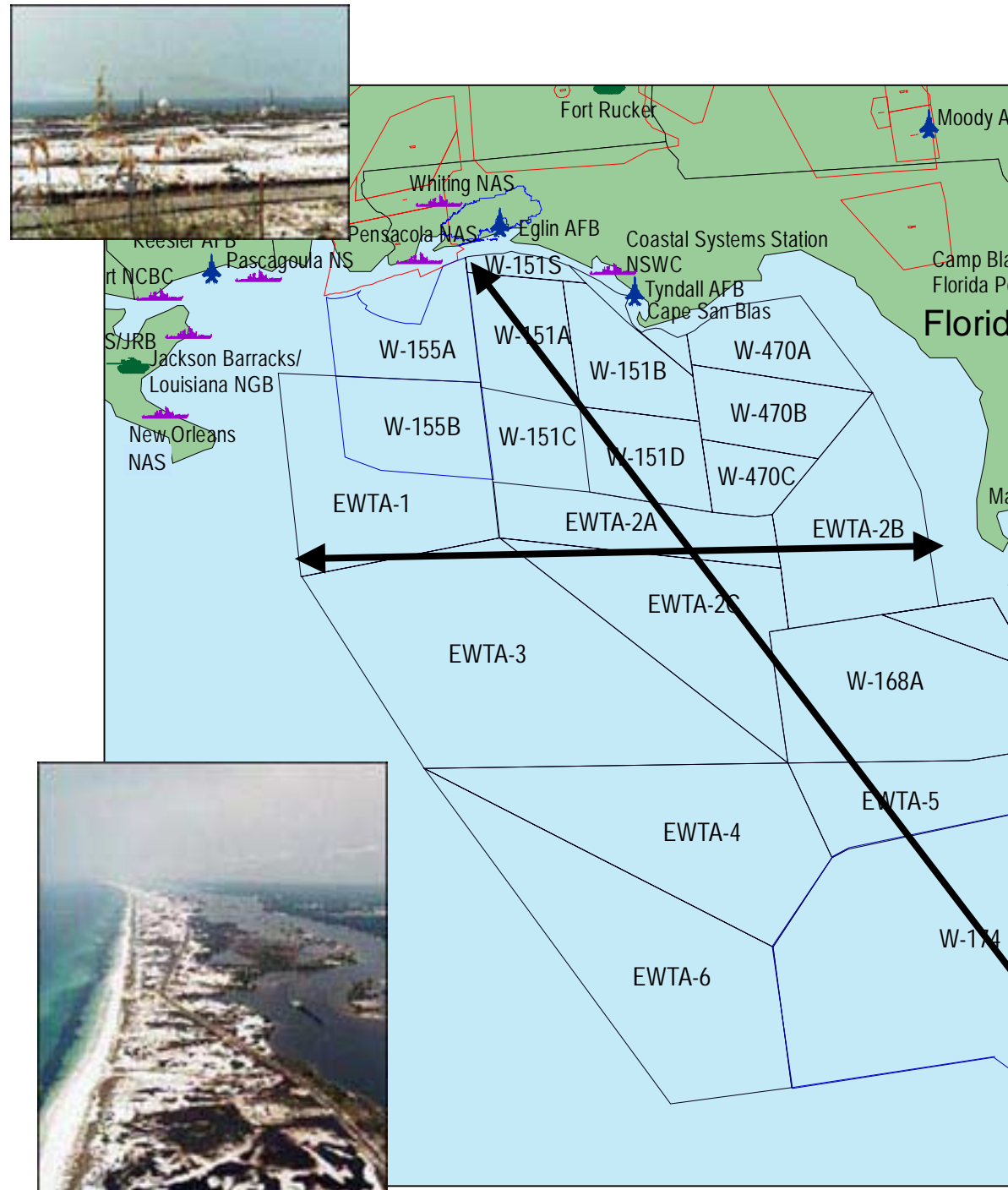
The Gulf Range Complex encompasses the Eastern Gulf of Mexico south of Alabama and Florida. It extends from Key West in the south to the panhandle of Florida in the north. The resulting 400 by 200 mile area has many unique characteristics:

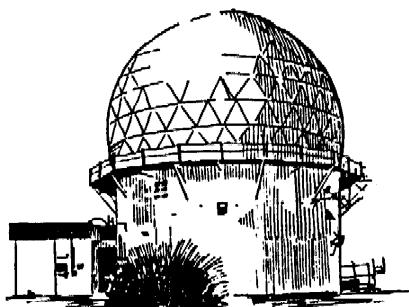
- 180,000 square miles of DoD controllable airspace over the Gulf composed of Warning Areas and Egin Water Test Areas with low RF background
  - Hazardous and supersonic operations
  - Multispectral operations
- 724 square miles of adjacent land range
- 3,200 square miles of airspace over adjacent land
- 17 miles of shoreline with connected prohibited and restricted water areas
- Cape San Blas remote radar and launch site

An array of support systems complements the physical assets and supports extensive testing and training.

- Multiple interconnected radars
- Time-Space-Positioning-Information systems
- Mission Control Center at Eglin
- Air Combat Maneuvering Instrumentation Range
- Two launch areas for missiles
- Full and subscale drones
- E-9A for TM and UHF relay plus surface clearance
- Centralized scheduling system

Integral to the Complex are numerous DoD facilities surrounding the eastern Gulf of Mexico and extending into the Southeastern region of the United States that use and support the Complex.





*“The Eastern Gulf of Mexico is one of the few places that long-range air-to-air engagements and long-range standoff strike employment can take place with new generations of weapon systems.”*

*Maj Gen Michael C. Kostelnik  
Commander  
Air Armament Center*

# The Mission

The Gulf Range Complex supports both testing and training operations. The majority of the missions are performed in the northern Gulf in the W-151 and W-470 Warning Areas due to proximity to home bases, radar and telemetry reach, and the range of rescue resources. Currently 75% of the missions are in support of training.

**Training** includes a multitude of mission types:

- F-15 Combat Crew Training
- Operational Fighter Wing Training
- Weapon Systems Evaluation Program
- Special Forces Training Including Airdrops
- Navy Cruise Missiles in Atlantic, Gulf, and Southeast US
- Carrier Battle Group Training in Gulf
- Littoral Warfare Beach Assaults
- Air Weapons Controller Training at Tyndall AFB
- Command & Control and Battle Managers Training at Hurlburt
- Exercises
  - Composite and Joint Force Training Exercises
  - Expeditionary Air Force Exercises

## Testing

- Air Force Stores Certification Testing
- Special Operations Testing
- Multispectral System Testing
- Air-to-Air Weapons Testing
- Air-to-Surface Weapons Testing
- Surface-to-Air Weapons Testing
- Ship Surface-to-Air Trials
- Shipshock Testing
- Mine Warfare Testing
- Littoral Warfare Testing
- Experimentation
  - All Services Combat Identification Team
  - Expeditionary Force Experiment (EFX)





# The Partners

The Joint Gulf Range Complex Strategic Plan is the result of a number of user organizations who have a vested interest in the Complex. They work collaboratively day-to-day and see the unique value of the Gulf Range Complex now and in the future. As the Complex's DoD steward, the Air Armament Center's 46th Test Wing formed an Integrated Process Team with these partners to jointly develop a Gulf Range Complex Strategic Plan.



## Air Force

**46th Test Wing** at Eglin AFB is the manager of the Gulf range. The wing's primary responsibility is for air armament developmental testing of both air-to-air and air-to-ground weapon systems. As range steward, the wing is responsible for test and training support to all Services.

**53d Wing** at Eglin AFB serves as the focal point for the Combat Air Forces in electronic warfare, armament and avionics, chemical defense, reconnaissance, and aircrew training devices. The wing is also responsible for operational testing and evaluation of new equipment and systems proposed for use by these forces.

**33d Fighter Wing** at Eglin AFB is a combat-flying unit of Air Combat Command's 9th Air Force and is a major tenant unit on Eglin AFB. The wing operates two flying squadrons, the 58th and 60th, each with F-15C/D Eagles.

**AF Research Laboratory Munitions Directorate** at Eglin AFB develops, integrates, and transitions science and technology for air-launched munitions for defeating ground fixed, mobile/relocatable, air, and space targets to assure the preeminence of US air and space forces.

**325th Wing** at Tyndall AFB FL provides F-15 air crew initial and follow-on training.

**347th Composite Wing** at Moody AFB GA is an operational unit flying F-16, A-10, C-130P, and HH-60G. It also supports the 24th Infantry Division, Ft Stewart GA.

**6th Refueling Wing** at MacDill AFB FL is an operational unit flying KC-135s and provides direct support to the six Unified Commands worldwide.

**AF Special Operations Command (AFSOC)** at Hurlburt Field FL is responsible for providing Air Force special operations forces for worldwide deployment and assignment to regional unified commands to accomplish the following special operations activities: unconventional warfare, counter-proliferation, direct action, psychological operations, special reconnaissance, civil affairs, combating terrorism, foreign internal defense, and information operations.

**16th Special Operations Wing** at Hurlburt Field is an operational unit of AFSOC with CH-53 and AC-130 providing Special Forces support world-wide.

**919th Special Operations Wing** at Duke Field FL is an operational unit of AFSOC with MC-130P Combat Shadow.



## Navy

**Naval Coastal Systems Station** in Panama City FL, is part of the Naval Surface Warfare Center, Dahlgren Division, and is the Navy's RDT&E center for coastal missions - Littoral Warfare, Mine Warfare, Amphibious Warfare, Special Warfare, Diving, and Life Support.

**Navy School Explosive Ordnance Disposal (EOD)** on Eglin AFB is the DoD agent for training all services' EOD personnel.

**Naval Air Station Pensacola** in Pensacola FL, is a major shore facility with deep water port facilities and airfields to support a variety of DoD operations.

**Whiting Field** in Milton FL, with associated auxiliary fields, provides undergraduate pilot and navigator training.

## Army

**Army Aviation Center** at Fort Rucker AL is responsible for development of Army aviation forces concept, doctrine, organization, training, materiel, and soldier requirements and training.

**Army Ranger School** at Camp Rudder on Eglin AFB is a unit of the Ranger Training Brigade, Fort Benning GA, and is responsible for the tropics phase of Army Ranger Training.

**Army Aviation and Missile Command** at Redstone Arsenal, Huntsville AL, is responsible for development, acquiring, fielding, and sustaining aviation and missile systems.

## Other Units

**Spaceport Florida**, an agency of the state of Florida, is dedicated to the advancement of space business in Florida. They are planning on using the Eglin land facilities and the Gulf Complex for commercial space launch operations.

**Coast Guard Station Destin** is located on Eglin AFB and provides marine search and rescue, aids to navigation operations and maintenance, emergency assistance, and maritime law enforcement. Station Destin also supports mission activities in the Gulf Range.

# The Region

The Eastern Gulf of Mexico is unique in many aspects. It has unsurpassed natural resources, extensive air and seaspace with light utilization. Surrounding areas are not heavily populated, while growth in some areas is rapid. There is strong support for the DoD mission in the region.

## Environment

**Air** - The region is in attainment for air quality standards. DoD dedicated airspace is extensive with major contiguous overwater and land restricted airspace.

**Land** - Development is limited to major cities around the Eastern Gulf. DoD has extensive land-based facilities with ready land, air, and sea access to the Gulf.

**Shoreline** - The DoD controls significant shoreline and estuarine resources. Other portions of the shoreline are owned by the State of Florida. Some shoreline is commercialized in the western panhandle, while the Big Bend area has extensive marshlands.

**Water** - Quality of the surface water is good and coupled with the beaches is a tourist attraction. Gulf bottom is sandy with little structure and relatively shallow out to 25 miles from shore. The Gulf is representative of the Persian Gulf environment.

## Trends

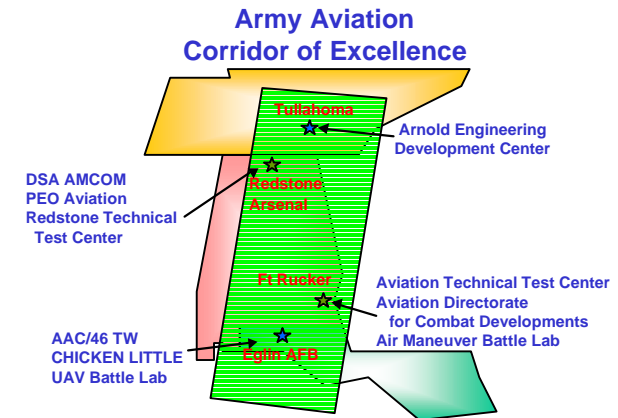
**Offshore Oil and Gas** are proposed for a portion of the Gulf and is limited to areas west of Pensacola FL, thus preserving the DoD mission.

**Population** is concentrated on the coast and is growing along portions of the coastline, while many inland areas project little growth.

**Air Traffic** is light in the region with an FAA jet way crossing the Gulf Range Complex. Traffic is regularly rerouted for DoD operations.

**Underwater Gas Pipeline** is proposed under the Gulf from Mobile AL to Tampa FL, with major portions buried to accommodate the DoD mission.

**Boating and Shipping** are light, with growth concomitant with the population. Boating primarily consists of pleasure craft operations.



## Partnerships

**Florida Defense Alliance** funds improvements, which benefit both the community and military installations.

**Gulf Coast Alliance for Technology Transfer (GCATT)** is an innovative partnership of federal laboratories, state universities and community colleges in Northwest Florida and Southern Alabama fostering economic development through the transfer of technology.

**Army Aviation Corridor of Excellence (AACE)** is a network of organizations (see figure above) committed to Army Aviation test, training, and tactics excellence.

**Regional Planning** occurs at the federal, state, and local level in forums sponsored by the Regional Planning Council. Participation in these forums ensures that Air Force needs are factored into the regions planning.

**Gulf of Mexico Program**, supported by federal and state agencies, is dedicated to better science for wise use of the Gulf.



# The Policy

## National Defense Policy Directions

The **nation** is experiencing unprecedented economic growth. The growth is being fueled by exploding technology that is improving productivity and keeping inflation under control. At the same time, the nation functions as the world military leader to project force if required against oppressive governments that threaten our national interest. This drives a **need** for a superior equipped, well-trained military force to respond quickly to diverse threats worldwide.

Accelerating rates of change will make the future environment more unpredictable and less stable, presenting our Armed Forces with a wide range of plausible futures. Whatever direction global change ultimately takes, it will affect how we think about and conduct joint and multinational operations in the 21st century. How we respond to dynamic changes concerning potential adversaries, technological advances and their implications, and the emerging importance of information superiority will dramatically impact how well our Armed Forces can perform their duties in 2020.

## DoD - Joint Vision 2020

*“JV 2020 builds upon and extends the conceptual template established by JV2010 to guide the continuing transformation of America’s Armed Forces...To build the most effective force for 2020, we must be fully joint: intellectually, operationally, organizationally, doctrinally, and technically.”*

**Full Spectrum Dominance**, the capability to dominate opponents across the range of military operations, is the goal of JV 2020. This will be achieved by the following four operational concepts when coupled with **Information Superiority** and **Innovation** - technologically and organizationally:

**Dominant Maneuver** is the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space forces to accomplish assigned operational tasks.

**Precision Engagement** is a system of systems that enables our forces to locate the objective, provide responsive command and control, generate the desired effect, assess the level of success, and retain flexibility to reengage with precision.

**Full-Dimensional Protection** is the control of the battlespace to ensure our forces can maintain freedom of action while providing multi-layered defense for our forces and facilities.

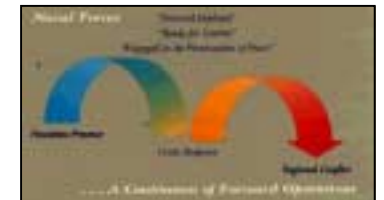
**Focused Logistics** is the fusion of information, logistics and transportation technology to provide rapid and tailored logistics packages and sustainment at strategic, operational and tactical levels of operations.

## Service Directions

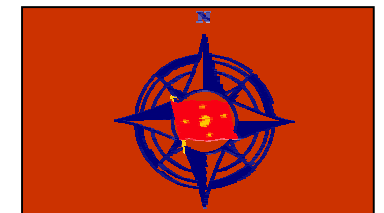
### Air Force



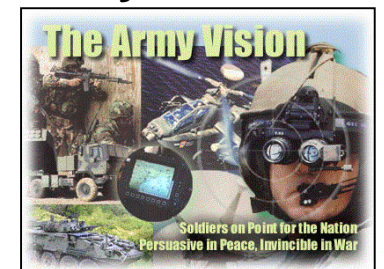
### Navy



### Marines



### Army



## Based on Joint Vision 2020 - Transforming the joint force for the 21st Century

### *“Global Vigilance, Reach & Power”*

- **The Foundation** - Our People and Our Values
- **The Domain** - Aerospace
- **The Method** - Expeditionary Aerospace Force
- **The Building Blocks** - Our Core Competencies
  - Aerospace Superiority
  - Information Superiority
  - Global Attack
- Precision Engagement
- Rapid Global Mobility
- Agile Combat Support
- **The Approach** - Innovation & Adaptation
  - Unmanned Aerial Vehicles - Eglin AFB
  - Battle Management - Hurlburt Field
- **The Commitment** - Keeping the Trust
  - Aerospace Domain of Joint Team

### *“Forward From the Sea”*

- Naval Expeditionary Forces based in US
- Priorities away from operation on the sea to power projection across a wider continuum of operations - peace keeping and regional conflict
- Power projection from the sea to influence littoral regions worldwide requires:
  - New information technology to react quicker
  - New land attack capabilities - aircraft, ships, guns, submarines ...
  - Theater Missile Defense
  - Mine-hunting and clearing organic to fleet

### *“Operational Maneuver From the Sea”*

- Builds on “Forward From The Sea”
  - A concept for the projection of Naval Power ashore
  - Adapts maneuver warfare to all aspects of warfare in and around coastal waters
- Principles
  - Focus on operational objective
  - Use sea as maneuver space
  - Generate overwhelming tempo and momentum
  - Pits strength against weakness
  - Emphasize intelligence, deception, and flexibility
  - Integrates organic, joint, and combined assets

### **Army Vision 2010**

- Leverage technology to ensure our force advantage
- Lighten-up heavy forces and heavy-up light forces
- The Way Ahead
  - Dominant Maneuver
  - Precision Engagement
  - Full-Dimension Protection
  - Focused Logistics
  - Information Superiority

*“DoD Vision: A joint training and test range structure that supports seamless, integrated operations across the physical boundaries of designated, cooperatively linked test and training ranges.”*

*Joint Training and Test Range Roadmap*

# The Drivers

## Technology

Rapidly advancing technology trends of the world are changing our nation and potential adversaries. This era will be one of accelerating technological change. Critical advances will have enormous impacts on all military forces. Successful adaptation of new and improved technologies may provide great increases in specific capabilities. Conversely, failure to understand and adapt could lead today's militaries into premature obsolescence and greatly increase the risks that such forces will be incapable of effective operations against forces with high technology. Information technology, coupled with global communications, is revolutionizing warfare's precision and surgical lethality.

## Weapons

Long-range autonomous precision capability, combined with a wide range of delivery systems, is emerging as a key factor in future warfare.

## Experimentation

Need for experimentation will grow dramatically to reduce cycle time and to demonstrate the potential for technology pull of requirements.

## Joint Tactics and Doctrine

Open-air testing and training will be needed at the tactics and doctrine level instead of at the individual weapon level.

## Modeling and Simulation

Testing of new systems will increasingly rely on modeling and simulation with open-air testing to validate ever increasingly sophisticated models. Training will see rapidly increased use of modeling and simulation to get the maximum return from the limited operational systems hours. Open-air training will be integrated with models and simulations to produce hybrid training. Open-air training will provide validation of training models. Goal will be to push the envelope in maximizing modeling and simulation to ever increasingly complex scenarios.

## Cost

Affordability of systems and their testing and training costs are increasingly important with reduced military spending.

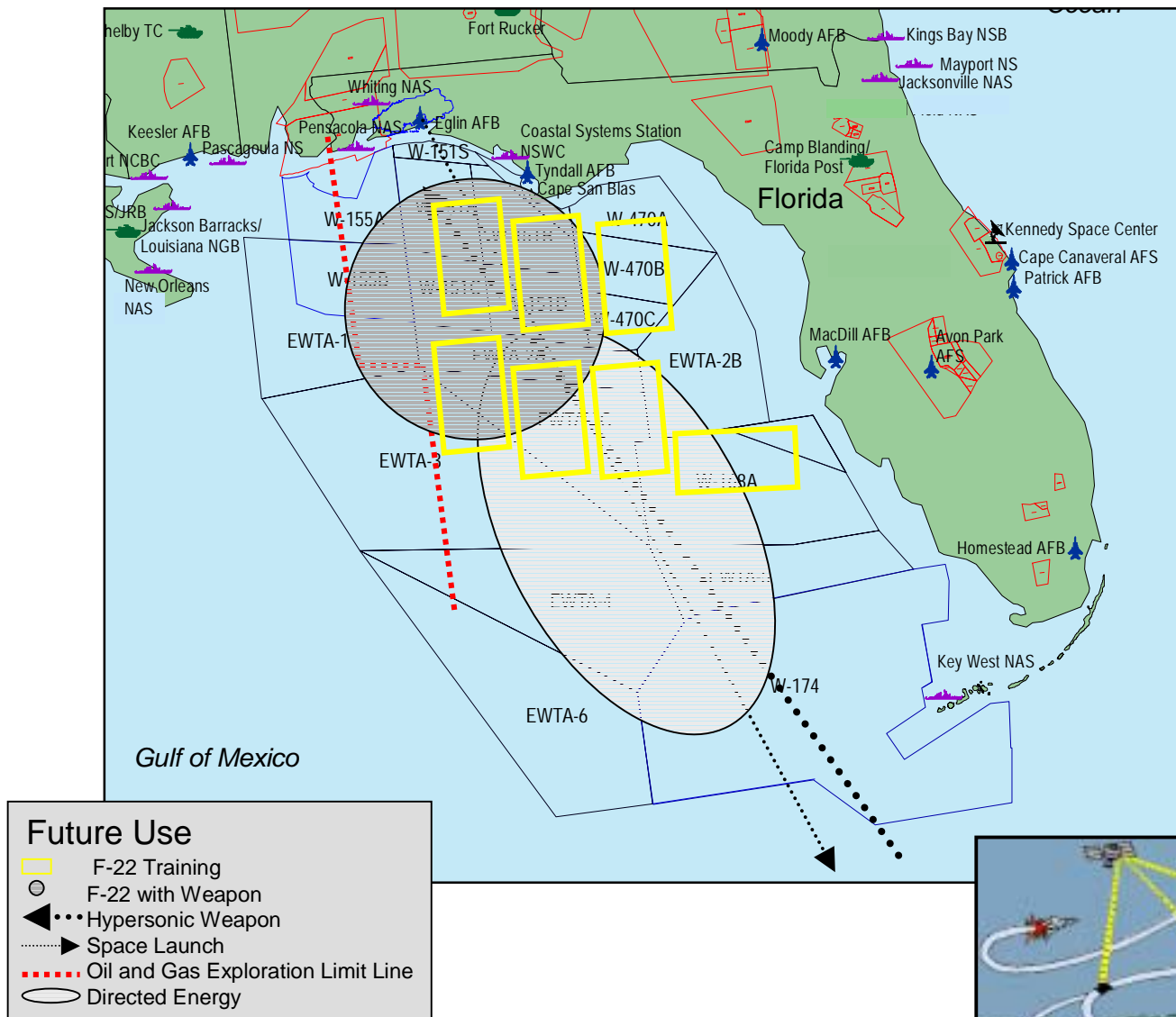


## Unmanned Vehicles

A whole new dimension of warfare will utilize UAVs, weaponized UAVs (UCAVs) and UMVs for a host of missions including weapons delivery.



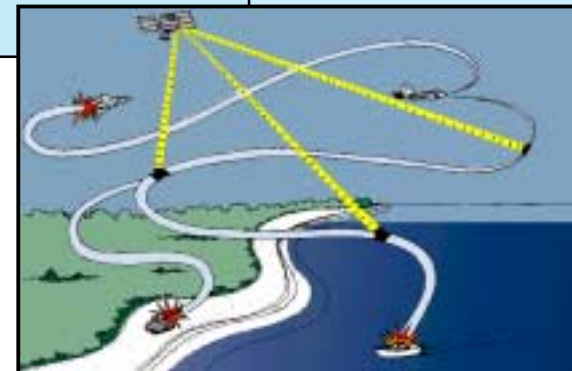
## Future Mission



*“New weapon system performance capabilities and new Warfighter doctrine, as detailed in Joint Vision 2010, will expand the demand to integrate multiple ranges, facilities and simulations.”*

## Joint Training and Test Range Roadmap

## Joint Tactics and Doctrine & Littoral Warfare



# Joint Gulf Range Complex Goals

The Joint Gulf Range Complex Goals represent the philosophy of the range users. The goals define the desired future, a management structure to attain that future, and an outreach need in the region to maintain military civilian compatibility.

## Goal 1

### User Needs

Maximize the capability of the unique air, land, and sea resources with Gulf Range Complex assets while continuing to be a good steward of the regional environment in order to:

- **Support 21st Century Warfighter** test and training needs
- Continue to be an outstanding host to all **using units - local or deployed**
- Maintain a high **quality of life**

Goal 1 recognizes the role of the range in providing balanced support to the DoD Warfighter as well as overall regional quality of life.

## Goal 2

### Joint Planning

Develop a **Joint Complex-wide planning perspective** of using units through proactive identification and joint resolution of operation and development initiatives that address:

- **Jointness** in planning for the future and scheduling for today
- **Interdependence** of actions concerning range development and infrastructure
- **Stewardship** requirements of the unique ecosystems entrusted to DoD
- **Synergism** of individual capabilities combinations, which enhance the Gulf Range Complex position as a national asset

Goal 2 establishes a planning focus on the total Complex vice individual user needs.

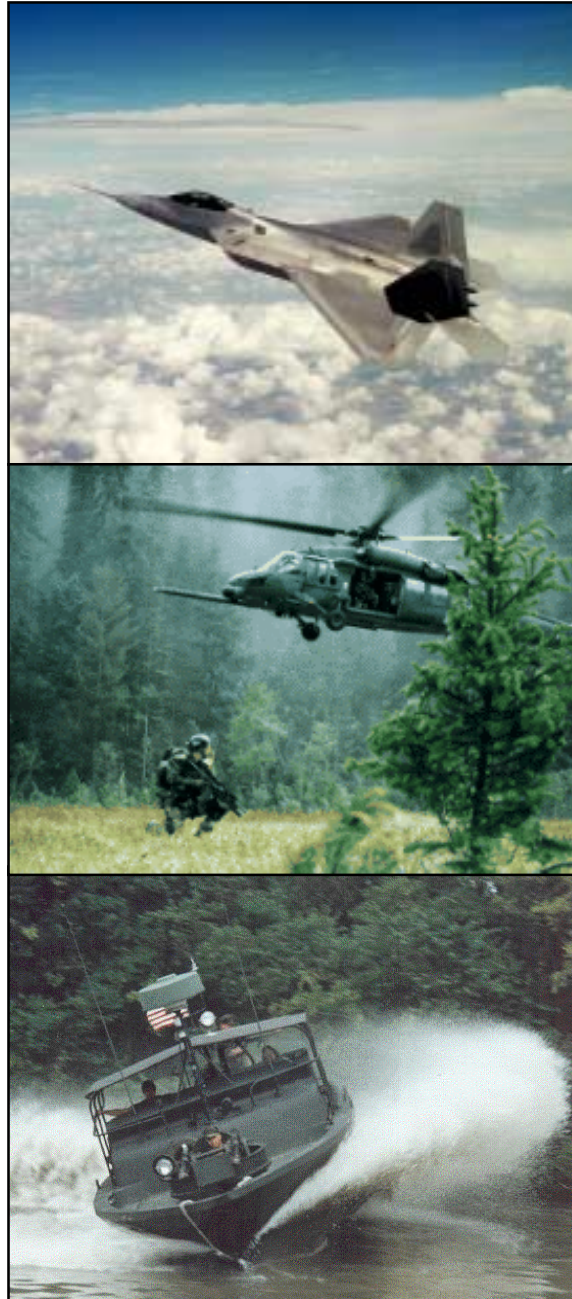
## Goal 3

### Regional Perspective

Enhance the partnership between the Gulf Range Complex and the region by fostering integrated planning processes and coordinated development plans that fully consider both of the following conditions:

- Impact of the **Gulf Complex** mission on the region
- Impact of **regional growth** patterns on Gulf Complex development

Goal 3 links the Gulf Complex operational needs to the community and community needs to the Complex for the betterment of both.



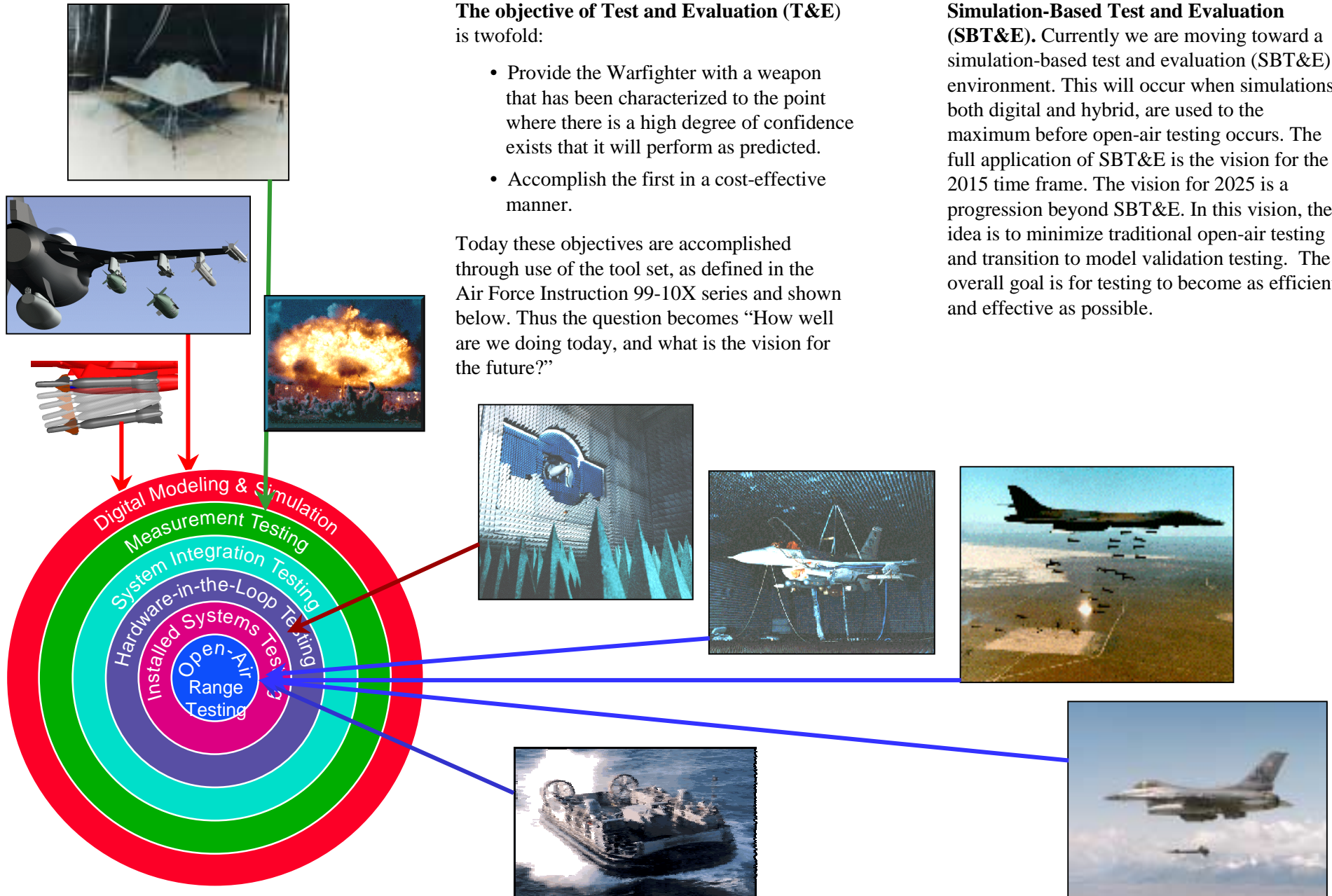
# Testing Objectives

**The objective of Test and Evaluation (T&E)** is twofold:

- Provide the Warfighter with a weapon that has been characterized to the point where there is a high degree of confidence exists that it will perform as predicted.
- Accomplish the first in a cost-effective manner.

Today these objectives are accomplished through use of the tool set, as defined in the Air Force Instruction 99-10X series and shown below. Thus the question becomes “How well are we doing today, and what is the vision for the future?”

**Simulation-Based Test and Evaluation (SBT&E).** Currently we are moving toward a simulation-based test and evaluation (SBT&E) environment. This will occur when simulations, both digital and hybrid, are used to the maximum before open-air testing occurs. The full application of SBT&E is the vision for the 2015 time frame. The vision for 2025 is a progression beyond SBT&E. In this vision, the idea is to minimize traditional open-air testing and transition to model validation testing. The overall goal is for testing to become as efficient and effective as possible.



# Summary

## Near Term:

- Optimization of the test and evaluation tool set to support the Warfighter
- Beginnings of Simulation-Based Test and Evaluation (SBT&E)
- Establishment of a combined DT/OT organization

## Mid Term:

- Use of SBT&E as an acquisition and testing tool
- Enhanced reachback test capability

## Far Term:

- Operational Environment (air, land and sea) used for experiments and to support innovative development
- Most developmental T&E done through simulation
- Integration of test and training simulation into simulation-based test and training

**Combined DT/OT** will become a major approach to testing. Through a close partnership with the production office, the combined DT/OT organization will participate in the birth, sustainment, and demilitarization of systems. Combined DT/OT will facilitate system effectiveness evaluations and provide immediate feedback to the Warfighter. Not only will this improve the test process, but the approach will enable the Warfighter to quickly test concepts/improvements during a real-world military operation.

**Reachback Capability** will continue to be an important part of test objectives that support the Warfighter. The military operations in the last ten years have clearly demonstrated the need to have a quick-reaction test capability. During each operation, use of existing test facilities expedited the urgently needed improvements. This capability must readily respond to war-time situations requiring improvements to weapon systems, electronic combat systems, or C2 systems. Quick answers and solutions must be provided to the Warfighter to give a decisive edge in the battlespace.



**The Joint Synthetic Battlespace  
“Simulation-Based Test and Evaluation”**



# Training Objectives

## The Training Objectives are:

- Give the Warfighter experience and confidence in the operation of their combat systems.
- Determine the effectiveness and readiness of the Warfighter and their combat systems.
- Identify weaknesses in DoD systems and determine an action plan to remove deficiencies.
- Increase productivity and reduce life-cycle cost.

*Train like we  
fight*

*and*

*Fight like we  
train*

Satisfying the first objective requires that the Warfighter and combat systems be emerged in **realistic and diverse air, land, sea, undersea, and littoral maneuver areas** that are large enough to contain the training operation within acceptable safety criteria and have **widely varying weather conditions. Realistic threats and targets** are required to challenge the Warfighter's abilities and capabilities. Command and control are critical to any military expedition; therefore, representative C2ISR networks are necessary to fully assess the communication and coordination of units and systems.

The second objective requires the Warfighter and their combat systems to be instrumented to measure effectiveness and readiness. In addition, the range must support with efficient, affordable, capabilities.

The third objective requires **analysis of data** collected from each training mission to identify deficiencies. Analysis requires the test and training process to explore alternatives needed to determine technically feasible and affordable solutions.

The fourth objective will require ready access to test and training resources. Increasingly heavy use will be made of digital models, man/hardware-in-the-loop simulation, installed systems integration, virtual reality technology and other simulation based tools now and in the future. Interoperable range, platform, and munition instrumentation is also needed to improve productivity and reduce cost.



## Training-Friendly Range

The Joint Gulf Range Complex should support training as an integral part of the operations and recognize the unique demands of training. Training is integrated with testing as a full partner.

## Common Systems

Common or Interoperable Range Systems, which can capture engagement truth data, maneuvering, weapon flyout, and dynamic kill removal.

## Virtual Systems

Populate the Joint Gulf Range Complex with realistic and simulated ground and electronic targets enabling joint forces to employ ordnance, with scoring, during training activities.

## Joint Exercises and Experimentation

The Joint Gulf Range Complex will support all military services and reserves, providing air, land, sea, undersea, and littoral maneuver areas, facilities, logistics, command and control, and scheduling on a daily basis.

*“Experimentation is a long-term enterprise, not a series of isolated events. It is not a demonstration or an exercise. It is a continuing and iterative process of developing and assessing concept-based hypotheses to identify and recommend the best value-added solutions for the future joint force.”*

*H.W. Gehman, Jr.  
Admiral, US Navy  
Commander in Chief  
US Atlantic Command*

# Planning Areas

Five planning areas are the foundation of the plan. Each planning area had a joint team working over a year that identified future trends in the mission area. Then the team documented the future test and training needs. This was followed with the identification of specific Joint Gulf Range Complex strategies for the mission area in the near term (5 years), midterm (5-15 years), and long term (15 -25 years). It is this information that is summarized on the following pages for each planning area.

## Armament

This planning area includes multiple aspects of armament: Counter Air, Counter Surface, Surface to Surface, and Subsurface. Types of systems include air-to-air missiles, air-to-ground missiles/munitions, directed energy, guns, artillery, ship-based guns.



## C2ISR

The Command, Control, Information, Surveillance, and Reconnaissance planning area encompasses information and its use to effectively accomplish the Warfighter's goals. Interconnection with many nodes (operation centers) and rapid transfer of information are key to giving the commanders superior advantage in the battlespace. The evaluation of the C2ISR systems includes measurement of the effectiveness of the system performance.



## Special Warfare

Special Warfare is a broad planning area that includes clandestine operations, unique operation specialties, and many types of operational scenarios in an all-weather environment. Due to the unique aspects of Special Warfare and the great regional capability to support Special Operations, the Gulf Range Complex is ideally suited for joint test and training. This mission area covers maritime, under sea, and land operations.



## Multispectral

The multispectral planning area involves the representation of land and sea threats, targets, and the evaluation of countermeasure effectiveness. The enemy's use of countermeasures denies information to the Warfighter and/or reduces their effectiveness by affecting the accuracy of munitions, and target detection.



## Littoral

The littoral planning area encompasses vast sea and land areas. Rapid maneuver from the sea is a primary objective of the Marine and Navy forces. This mission area requires the evaluation of rapid assault systems. The littoral mission covers a broad spectrum to include air superiority, precision attack, naval surface fire support, and ship self-defense.



# Armament

## *Future Systems and Operations*

**All Aspect, Longer Standoff.** Future ship, tank, and aircraft platform sensors will enable threat detection, identification, lock-on, and munition launch in any direction, and at increasingly greater distances. The munitions will have increasingly longer range capabilities with distances exceeding 600 miles.

**Autonomous, Launch and Leave.** The multitude of sensors and navigation aids today will increase. This will provide greater “built-in” munition ability to locate, detect, identify, lock-on, and attack threats.

**Precision and Speed.** Munition accuracy and velocity will increase dramatically, enabling more kinetic energy to be placed at the “Hit to Kill” point of the target. This will enable effective kills to be made with smaller munitions and minimize “collateral damage.”

**Missile Defense.** Surface-to-air high velocity weapons will be developed to defeat air-launched (cruise missile) and surface-launched missiles.

**Directed Energy.** The new technology, directed energy weapons, will be integrated into air, land, and sea military platforms to provide almost instant kills, long standoffs, renewable kill mechanisms, and other capabilities.

**Nonlethal Weapons.** Nonlethal weapons are a special armament category that provide the capability to defeat a threat without a “kill” occurring. There will be increasing emphasis to create weapons which neutralize chem/bio threats or temporarily confuse enemy forces.

**Counter Subsurface.** Special deep penetrating munitions will be increasingly effective against very deep military threats. Weapons that counter the underwater threat from mines to submarines will be capable of being released from submersibles, surface ships, aircraft, and shore installations.



**Weaponized UAVs.** This special armament category will be capable of operating at low altitudes, high speeds, autonomously, over increased distances, and will use a variety of navigation/threat identification sensors. The weaponized UAVs will use a variety of kill mechanisms.

**Platform/Area Protection.** Increasingly sophisticated armament protection systems are being developed to defend ships, aircraft, land vehicles, and military operating areas. These gun, missile, directed energy, anti-ballistic missiles, and other kill mechanisms will be capable of being directed by advanced platform sensors and respond very swiftly to incoming threats.

**Multispectral Sensors.** Armament systems will incorporate sensors which span the RF, MMW, and infrared spectrums to increase the probability of kill in all kinds of weather.

## Test & Training Needs

### Open Air

**Environmental Diversity.** To prove effectiveness, the armament must be tested and performance evaluated in many different climatic environments and weather conditions.

**Vast Restricted Open-Air Space and Land/Water Space.** The evaluation of future armament will require a vast area containing airspace restricted to military operations and low commercial air traffic. This vast area will minimize safety risks when a powered missile is launched from an aircraft cruising above mach 1. To demonstrate the complete scenario of long-standoff weapons, a contiguous water-to-land range is needed to evaluate navigation and targeting accuracy. Precision tracking over large expanses of water will be needed to provide useful data to evaluate the accuracy of the weapon.

**GPS Jamming Over the Range.** Since future weapons navigation and targeting will depend primarily on the Global Positioning System (GPS), it will be imperative to test in a jamming environment. Thus, the test range will need to have permission to accomplish GPS jamming during the tests.

**Scene Generation Overwater.** Water impact areas will be used for some weapons evaluation. Since some of the weapons will use scene recognition as a means to hit the target, a simulated scene will need to be generated at the planned impact area.



**Data Transmission.** Data transmission systems must operate at speeds much greater than the system being tested. In the future, multiple data streams exceeding 100 megabits will be necessary. The high density of data streams will require more of the RF spectrum. Video systems will become an integral part of the instrumentation, and the data will have to be transmitted real-time for safety and determination of mission objectives. Thus, wider bandwidth will be required for the transmission.

**Streamlined Environmental Assessments.** The testing of each weapon system must have environmental approval. This approval process must be streamlined if DoD is to be responsive to the needs of the Warfighter. Programmatic environmental assessments will provide pre-approved assessments of classes of weapons. Thus, they will streamline approval and expedite responsiveness to urgent Warfighter requirements.

## Modeling & Simulation

**Complex/Sophisticated Engineering Models.** Cradle-to-grave engineering models and signature prediction code models are needed to characterize and evaluate armaments. These models will remain intact for the life of the weapon. They will need to be updated continually to incorporate system updates.

**Hybrid Analysis Systems.** Nondestructive testing of weapons inventory will be critical in the future because of the high unit cost of weapons. The hybrid analysis systems will need to evaluate navigation and targeting performance during full cycling of the propulsion system, if any. The high cost per unit and lower inventory levels of the precision weapons will necessitate the need for the hybrid analysis systems. The benefits of the systems will be the tremendous cost savings during sustainment of the weapons.

# Armament

## Strategies

### Near Term

**Study for Tetherless Instrumentation.** Studies should be initiated to integrate GPS and other satellite-based capabilities into the Joint Gulf Range Complex.

**Airspace Modifications.** The existing airspace over the Gulf Range has low commercial air traffic. The use of airspace for military purposes may be improved if the commercial routes are adjusted in the range areas most used by the military. In addition, reshaping the military operating areas (MOAs) in the Southeast will facilitate the use of airspace for test and training. In addition, these actions will improve the use of UAV operations for range instrumentation.

**Adaptable Flight Termination Systems.** Stand-off weapon systems and unmanned systems must have flight termination systems for safety. If these systems are not qualified, they must be tested for reliability and operation before placing them in a new weapon. Prequalified components that are installed for the flight termination will shorten the integration of the flight termination system into the weapon to be tested.

**Evaluation of Space-Based Capabilities.** As the Air Force moves to an “Aerospace” force, it will be important for the Joint Gulf Range Complex to evaluate space-based armament capabilities. Thus, studies should be initiated now for implementation of systems in 2015-2025.

**Alternate Telemetry Bands/Equipment.** To satisfy the need for multiple telemetry transmissions and reduce conflict with other transmission requirements, alternate telemetry bands will need to be authorized. The transmission equipment will need to be easily configured for the particular TM band allowed for the mission.

**Programmatic Environmental Assessments.** The Range General Plan initiated the action to obtain programmatic environmental assessments. This effort should continue so that testing of armaments can be accomplished without delays for environmental approval. Future programmatic environmental assessments will be needed for new classes of weapons.



**Real-time Model and Test and Training Operational Environment Data Integration.** Continue development of real-time models to reduce test and training cost. Provide realistic models with an integrated operational environment for tests/training. The development of the open-air hardware-in-the-loop capability should be continued and other projects similar to this should begin.

**Engineering Model Development.** Define architecture, then prototype and develop physics based models. Establish a process to continually improve the model(s) when new information is obtained.

**Initiate Action for Water-to-Land Munitions Impact Area.** To allow the safe transition of a standoff attack weapon from water to land, a munitions impact area needs to be established immediately adjacent to the Gulf of Mexico.

# Strategies

## Midterm

**Engineering Model Development.** Continue development efforts on engineering models, and create more physics-based models.

**Complete Water-to-land Munitions Impact Range.** Complete instrumenting the munitions impact range. Instrumentation should leverage available technology using GPS and other satellite-based instrumentation.

**Develop/Configure Realistic Targets.** Realistic targets will be necessary to fully test the advanced sensors used in weapon systems.

**Develop/Configure Realistic Threats.** Signals/signatures generated by realistic threats will test the advance weapon systems sensitivity to countermeasures. A multi-spectral realistic threat environment should be configured to adequately evaluate effectiveness of future weapon systems.

**Develop/Configure Scene Generation (including overwater).** Scene generation over a specific water area will be used in many types of testing and training, particularly joint testing, since it will free existing land range areas for other simultaneous tests.

**Establish Operational Ground Test Capability.** The operational ground test capability will be used for sustainment testing of weapon systems in the Air Force and DoD inventory. This will permit nondestructive testing of performance without the cost of expending the weapon in an operational environment.

**Continue Programmatic Environmental Assessments.** Further programmatic environmental assessments should be accomplished to facilitate littoral and special warfare activities involving munitions.

**Install GPS Jamming Systems for Overwater Jamming.** GPS jamming capability over the Gulf waters will reduce the conflict with commercial aviation and also fully test the GPS-guided stand-off attack weapons.

**Program for Space-Based Capabilities Risk Reduction Studies.** Conduct a study to build infrastructure for a Directed Energy Test & Training range

## Far Term

Total dependence on space-based capabilities for TSPI, surveillance, TM, and datalinks.

Establish directed energy and a test and training range.



# C2ISR

## Future Systems and Operations

**Distributed Operations.** Reachback Capability - the focus is to deploy as few troops as possible. Command centers will be staffed within the states and must rely on communication links to receive real-time intelligence.

**Super Networks.** Extremely High Bandwidth - with the amount of ISR data required during wartime efforts, as well as the amount of information required by the command centers, bandwidth requirements will increase significantly.

**Data Compression Technology.** Along with bandwidth increases, compression techniques will also improve to allow more data to be passed through a specific bandwidth.

**Instant Battle Damage Assessment.** The ability to instantly assess damage due to a mission will allow retargeting of follow-on missions and a more effective use of resources.

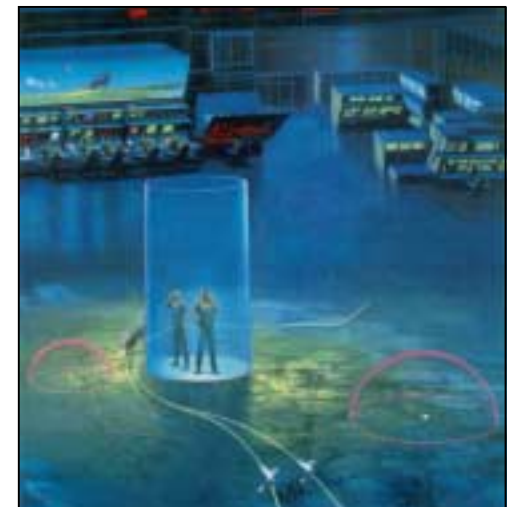
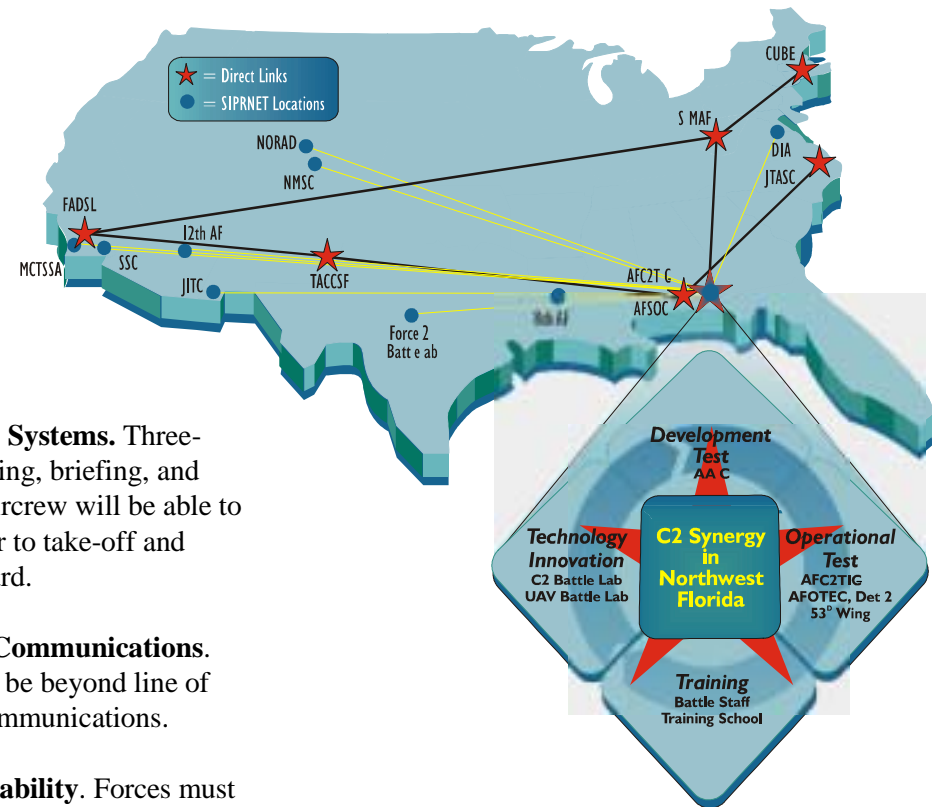
**Real-time Retargeting.** Real-time data in the cockpit will be used to redirect munitions based on real-time intelligence information.

**Virtual Mission Planning Systems.** Three-dimensional mission planning, briefing, and debriefing will be done. Aircrew will be able to fly the virtual mission prior to take-off and review the mission afterward.

**Dependence on Satellite Communications.** Most communications will be beyond line of sight, requiring satellite communications.

**Joint/Coalition Interoperability.** Forces must be able to see a common operational picture in order to work together effectively.

**Space-Based Command Centers.** Command centers based on space stations will control the aerospace battlefield.



# Test and Training Needs

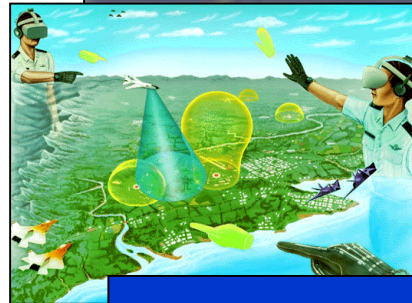
**Joint Synthetic Battlespace.** A test environment which accurately represents the true battlefield is needed.

**Automated Test Tools.** Test tools which simulate operational loading will be required to adequately stress systems.

**Evaluation of Extremely High Data Rates.** The data rate of C2 systems is expected to increase significantly in the future. A method of evaluating higher data rates will be required.

**Distributed Test Facilities.** With C2 test infrastructure scattered around the U.S., a method of testing a wide area network will be required.

**Real-Time Sensor-to-Shooter Test Range.** Test infrastructure will be acquired which will improve evaluation of surveillance inputs, UAV operations, and real-time data in the cockpit.



*“...the reason for our test success was the hard work, professionalism, and ‘can do attitude’ of Team Eglin”*

*Col Scott Parks, JSTARS Joint Test Force Director, 4 Nov 97*

*Team Eglin “provided the test leadership, structure, and discipline essential in executing our effort...”*

*Lt Gen Ron Kadish, ESC/CC, 23 Sep 97.*

# C2ISR

## Strategies

### Near Term

**Engineering Plants.** Collaboration with multi-service and contractor ranges/facilities to put in place a persistent architecture for distributed testing and modeling and simulation is currently being accomplished.

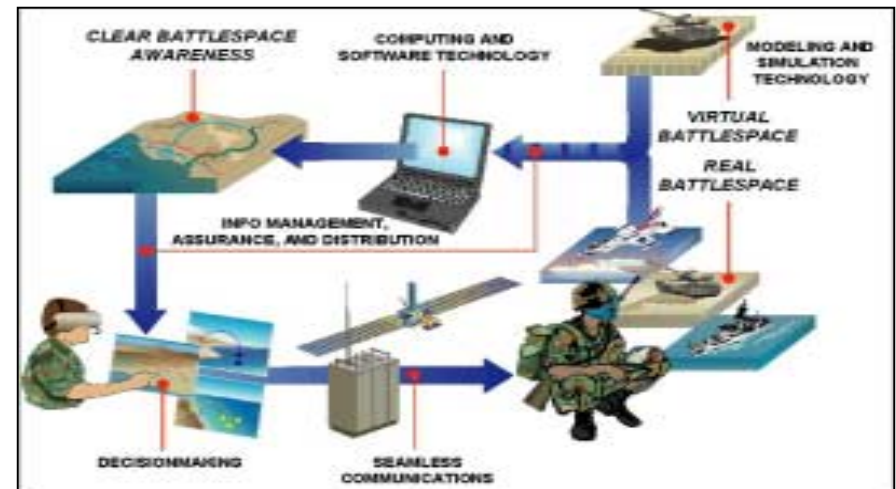


**Improvements to the Link-16 Facility.** The tactical data link of choice for the future is Link-16. Joint and allied forces will be able to use the same data link in order to ensure compatibility. This effort will platform specific Operational Facilities to support Link-16 system DT/OT&E, testing, training, maintaining, and sustaining efforts for the B-1, B-2, F-22, JSF, and other Joint and Allied platforms.



**C2ISR Modeling and Simulation Improvements.** Acquire models of test systems platforms and the combat environment.

**Improvement and Continued Modernization of C2 Facilities.** Simulation tools to stress C2 systems and C2 data collection and analysis tools.



# Strategies

## Midterm

**C2 Test Operations Center.** This effort will equip an existing facility with the test tools necessary to conduct functional, performance, and load/stress testing. This capability also includes a representative C2 weapon system (hardware and software), as well as dedicated land and SATCOM connectivity, to replicate the Warfighter's environment.

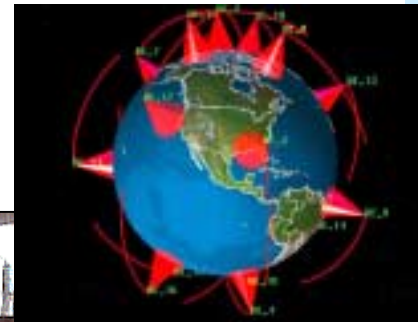
**Real-time Sensor-to-Shooter Test Capability.** This will test a system of systems capability to locate, acquire, ID, and track targets; coordinate with warriors and the Air Operations Center; engage a target, provide battle damage assessment; and accept real-time retasking orders.



## Far Term

**Satellite Linking.** In the future, networking will be done via satellite communication links. The Gulf Range Complex must be able to test the capabilities to network via satellite communication links. In addition, this networking will be required to test C2 System of Systems.

**UAV Test Resources.** UAVs will be required as part of the C2 System of Systems. They will carry out many of the missions and report back on Battle Damage Assessment. UAVs will also do a larger portion of the surveillance required prior to a mission.



## Information Superiority

“The **right** information at the **right** time disseminated and displayed in the **right** way so Commanders (and “Crew Chiefs”) can do the **right** things at the **right** time in the **right** way. **And do it all faster than the other guy.**”

*1998 Scientific Advisory Board Study*

# Special Warfare

## *Future Warfare Systems and Operations*

**Conventional Joint Special Operations.** Joint operations will be a necessity in the future. Otherwise, uncoordinated actions will result in disaster on the battlefield. Coordinated, swift attacks on enemy locations and targets will enable the Warfighter to control the battlespace and ultimately the victory.

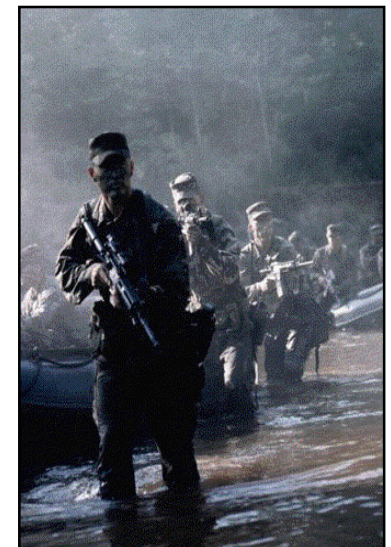
**Weapons of Mass Destruction.** Chemical and biological weapons are significant threats to the Warfighter. These weapons could be dispersed rapidly and deny commanders control of the battlespace.

**Military Operations in Urban Terrain.** As the population in major countries move to urban environments, military operations must develop systems and techniques to effectively and efficiently defeat the enemy in a densely populated area.

**Counter Terrorism.** Techniques and hardware/software will be developed to counter sophisticated terrorist activities.

**Maritime Counter Terrorism.** Techniques and systems will continue to be developed to counter highly complex terrorist marine threat systems, especially near-shore.

**Military Operations Other Than War.** These operations will increase in number and complexity. Third-world nations will use their limited resources to create disturbances in geographical areas to expand their influence/borders.



# Test and Training Needs

**Coastal Live Fire Ranges.** Fire ranges are needed to support unrestricted, realistic and integrated operational scenarios in a wide range of environments including off-shore, coastal, riverine, and land.

**Military Operations in Urban Terrain Facility (MOUT).** There is great need for a range facility that will provide a realistic environment for the Warfighter to conduct combative and non-combative military operations.

**Close Quarter Combat (CQC) Area.** The area should include a multi-story structure having the ability to be reconfigured on the interior with various ballistic walls that will allow use of a full range of weapons and breaching materials.

**Air Operations Support.** An air operations area is needed to provide combined battlespace of air and ground area for extensive freedom of maneuver for helicopter landings, equipment drops, insertions, close air support, and call for fire.

**Tactical Fire and Maneuver Areas.** This type of training area is required to integrate basic weapons and combat skills learned as an individual and practiced at the unit level.

**Land/Water Drop Zones.** There is a continuous need for certified drop zones to support High Altitude High Open (HAHO), High Altitude Low Open (HALO), and conventional parachute training/cargo delivery in direct support of Maritime and Air Operations.

**Demolition Ranges.** Demolition ranges are needed to support the development, test/evaluation, and training of surf zone obstacle neutralization, shallow water mine/countermine, and other air/surface/subsurface launched munitions.

**Land Navigation Ranges.** Land/water navigation training ranges that offer multiple training scenarios in a wide variety of terrain.



# Special Warfare

## Strategies

### Near Term

**Coastal Live Fire Ranges.** Develop ranges to support air, surface-launched direct and indirect fire from coastal, riverine-type craft, and airborne platforms including gunships and helicopters.

**Land/Water Drop Zones.** Develop additional drop zones for personnel and airborne load delivery as demand will increase with the inclusion of the multi-role V-22 into Special Operations fleet.

**Shallow Water Surf Zone Demolition Ranges.** Develop a specialized test and training capability for evaluating demolition weapon systems effectiveness to neutralize a wide variety of simulated coastal attacks.



# Strategies

## Midterm

**Tactical Fire and Maneuver Ranges.** Areas are needed to conduct coordinated target assaults, tactical ambushes, hot inserts/extracts, patrolling and armed escort exercises, and joint live fire with ground personnel. Weapons ranges are needed to include small arms (9mm, M-4, MP-5) and heavy weapon ranges (.50 cal, LAAW, mortars and hand grenades), as well as a sniper training facility with 1,000 and 2,000 yards known distance range (for sighting weapons) and steel plate range (reactive range with pop-up steel targets).

**MOUT & CQC Areas.** Reconfigurable multi-story urban structures to support live-fire and nonlive-fire operational scenarios. CQC house should be constructed adjacent to tactical live fire and maneuver range to optimize ingress/egress to a target objective.

**Land Impact Area.** Test and training live-fire impact area for naval surface fire support (direct/indirect weapon systems) and air-to-surface standoff munitions.

## Far Term

**Integrated Special Operations Training Facility.** Permanent complex supporting a wide variety of joint special operations force requirements featuring:

- Indoor range complex
- Target interdiction range
- Vehicular range
- Small unit tactics
- High level entry/climbing complex
- Urban range complex
- Subterranean range

**Integrated Maritime Special Operations Training Facility.** Actual ship (salvage) and oil or gas platform and dock complex that will support maritime combat training and other joint special operation requirements.



# Multispectral

## *Future Environment*

**Multispectral Environment.** The multispectral environment is continuing to emerge as a dominant factor in the battle space. It includes the following: the classic RF spectrum (2-18 GHz) where typical radar systems operate; millimeter wave systems; infrared systems; and electro-optical systems. In the past, systems performed in one mode and were active sources. The future systems will be drastically different.

**Passive Systems.** Systems will be “quiet,” giving almost no notice of signal transmission.

**Multi-Mode Systems.** Systems will operate in different frequency spectrums with agility.

**Sophisticated Countermeasure Techniques.** Systems will employ sophisticated software to disguise the threat system or inject erroneous signals or viruses to render the Warfighter’s system ineffective.



**Light-weight, Portable, Mobile Systems.** Solid state electronics will reduce the size and weight.

**Dense Threat Environment.** Proliferation of threats in combat area are easily accomplished.



**Undersea Environment.** Will consist of multiple actuation sensors on mines. Mines will have autonomous operation. New sensors will allow multiple signature assessment and target selection.

# Test and Training Needs

**Multispectral Threat Environment.** Dense and diverse environments are needed to simulate combat conditions.

**Up-to-date Multi-Mode Threat Simulators.** Simulators must model the actual threats to include agility across the threat spectrum.

**Multi-object Tracking.** Instrumentation must track multiple targets in order to evaluate training effectiveness and system development. Multi-object tracking will be necessary to measure/evaluate the effectiveness of countermeasures on weapon systems both in test and training.

**Instrumentation Systems.** Instrumentation is needed to evaluate high resolution imaging hyperspectral sensors, centimeter resolution IR, 3-dimensional imaging. Instrumentation is also needed to evaluate countermeasure hardware and techniques.

## Undersea Threat Characterization.

Undersea threats need to be characterized with regard to signature types such as acoustic, magnetic, optical, shape, and texture.



# Multispectral

## Strategies

### Near Term

**Threat Upgrades.** Existing threat emitters for special operations and operational test must be upgraded to ensure the Warfighter is prepared for the expected battle threat environment.

**Develop Target Signature Data Bases.**

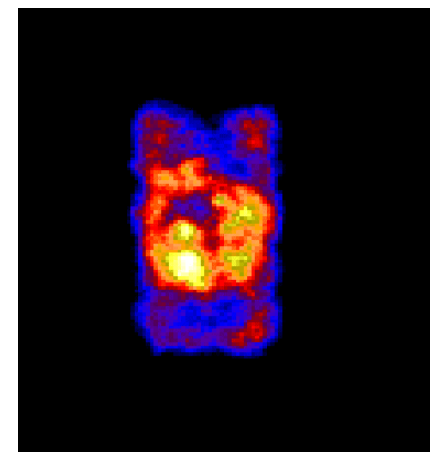
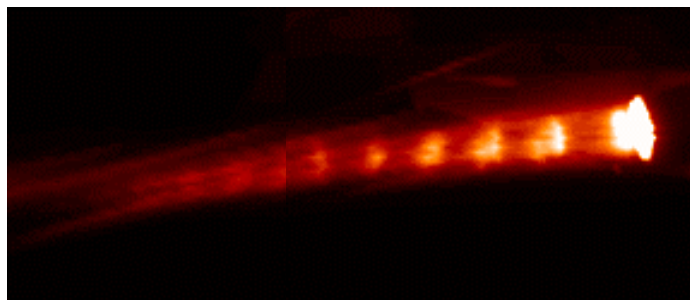
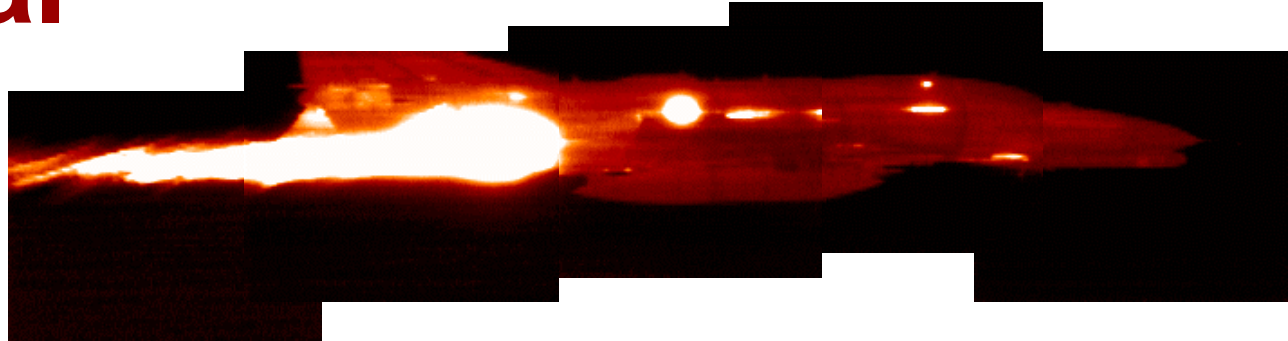
Common data bases used for multi-service testing will provide the DoD with the ability to compare test and training results at several range locations. In addition, a common database will result in lower test costs by eliminating duplicative testing and data analysis.

**Scene Characterization for Advanced**

**Munitions.** Develop advanced focal plane array imaging instrumentation to evaluate advanced sensors. Also develop active laser simulators.

**Land and Sea Mine Threat Upgrade.** Procure foreign mines for exploitation to keep threat inventory current with world threats. Increase inventory of both original and replica threats for use in testing and training scenarios. Modernize threat instrumentation to make compatible with newly upgraded fiber optic mine range.

**Develop Target Database.** Begin database of target underwater signatures as they are ranged locally. Develop a standard electronic format for this data for use in modeling and other analysis.



# Strategies

## Midterm

**Develop High-Resolution Radar Imaging Simulations.** Develop advanced 3-dimensional target and background/clutter models.

**Develop Linking of Simulations with C2ISR Infrastructure.** Linking of threat simulations to C2 command centers will provide more realistic war scenarios for the Warfighter.

**Enhancement of Open-air Hardware-in-the-Loop.** Integration of real-world targets, backgrounds, and scenarios will improve existing models and reduce future cost.

**Risk Reduction - Directed Energy Countermeasures Evaluation** - Studies should be accomplished to choose best techniques/systems to create and instrument future-directed energy countermeasures.

**Risk Reduction - Satellite Countermeasures Evaluation.** Accomplish studies to choose best techniques/systems to evaluate satellite countermeasures.

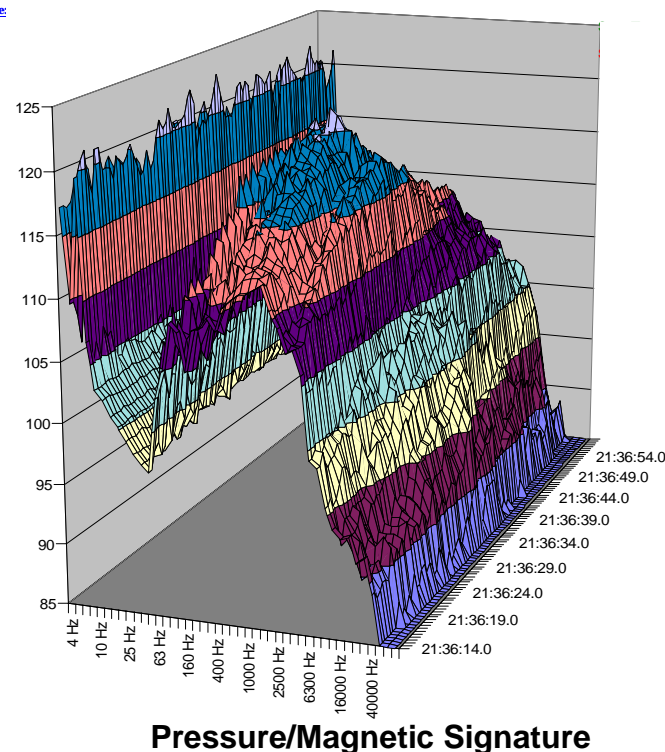
**Underwater Signature Range** - Increase the number of magnetic, acoustic and pressure sensors that can be deployed to enhance the ability for one pass ship signature evaluation. The size and weight of portable ranging system will be reduced to support testing and training in various environments worldwide. Improve surface and underwater tracking capability for the

littoral environment.

## Far Term

**Develop Directed Energy Countermeasures Instrumentation.** Establish capability to measure effectiveness of countermeasures techniques and systems.

**Develop satellite countermeasure instrumentation.** Develop capability to measure effectiveness of satellite countermeasures.



# Littoral

## *Future Environment*

**The Emerging National Agenda.** Military, economic, and political direction points to an environment of continuing change. Militarily, the nation is posturing itself toward the concept of joint expeditionary operations conducted in the forward-deployed environments of the world's littoral region. These operations will rely on a continuum of land attack capabilities. This continuum will add new dimensions to littoral warfare to include:

**Surf Zone Obstacle Neutralization.** Rapid neutralization of obstacles will be accomplished through use of explosives and directed energy.

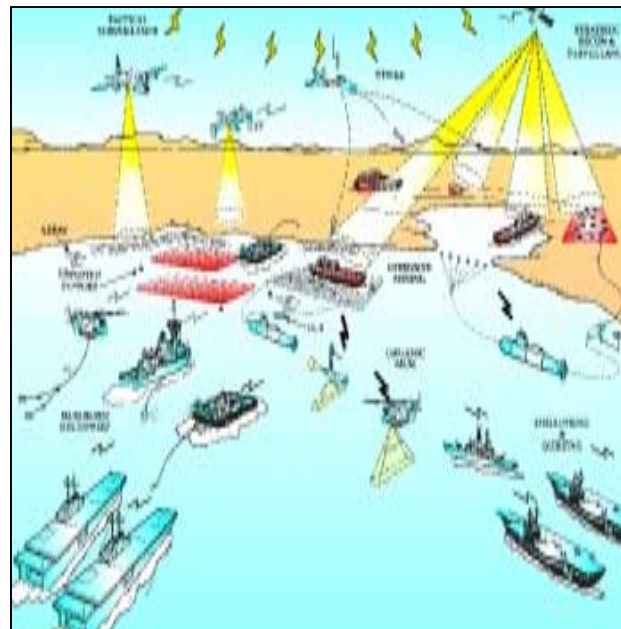
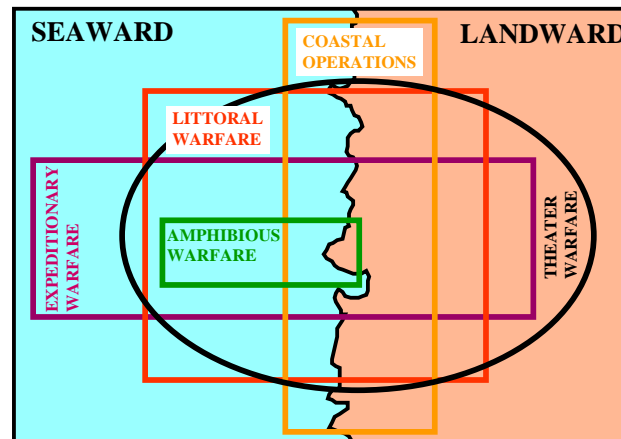
**Mine Neutralization.** Surf Zone mines will be neutralized rapidly using sophisticated detection and destruction systems.

**Rapid Assault.** The ship-based Warfighter will approach the littoral area at speeds exceeding 50 mph and establish control of the littoral battlespace rapidly. Mine clearance will be done in-stride.

**Riverine Assault and Operation.** Riverine areas, controlled by the enemy, will be neutralized rapidly using special assault vehicles/watercraft.

**Mine Countermeasures (MCM).** Mine Countermeasures will be employed using air, surface, unmanned underwater vehicles, and organic systems.

**Extended Range Guided Munitions.** Ship-based guns will fire rounds having extended ranges (greater than 70 mi) and guidance systems to provide pinpoint accuracy to the littoral impact area.



# Test and Training Needs

## Surf Zone Obstacle Neutralization

**Evaluation.** The effectiveness of obstacle neutralization systems must be evaluated to ensure the Warfighter can clear the surf zone effectively.

## Mine/Countermine Validation of Emerging

**Systems.** New mine and countermine systems will have to be evaluated in realistic environments. A seamless transition from simulations to open-air test/experimentation will provide an effective and affordable evaluation of these systems.

## Measure Effectiveness of Ship-Launched

**Munitions.** Evaluation of weapon accuracy and effectiveness will be necessary. To provide a realistic environment, an over-water scoring capability and a contiguous water-to-land transition will be needed.



## Live Fire Test and Training Areas

**Land/Water.** Contiguous water and land range areas are needed to provide a realistic environment for test/training/experimentation of surf zone, shallow-water, amphibious, land attack systems and operations. Communication and control systems will need to be an integral part of the range capability.

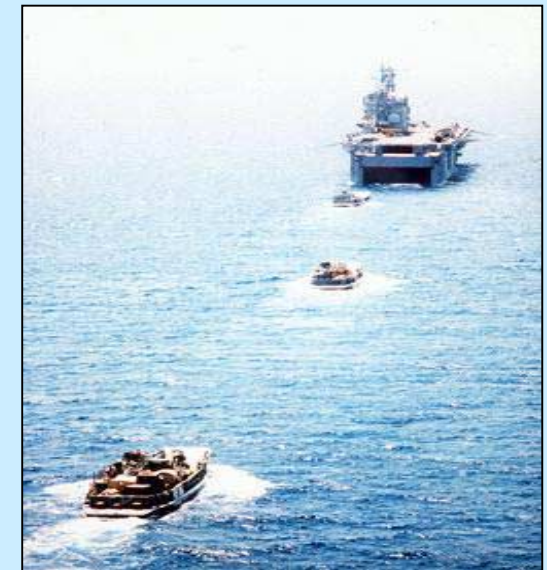
**Off-Shore Test Platform.** An off-shore platform is needed to provide a staging area for vertical take-off and rotary wing aircraft. In addition, the platform is needed for enhanced data acquisition of logistic systems and weapon systems at the same quality as land-based systems.

**Shallow Underwater Tracking Range.** An underwater tracking range is needed to evaluate the effectiveness of organic countermeasures installed on submarines and Autonomous Underwater Vehicles (AUV).



*“... If we are going to continue to excel in expeditionary warfare, we must ensure that the navy-marine corps team of the future has the right tools to completely dominate the littorals of the world”*

*ADM J. M. Boorda (CNO)*



# Littoral

## Strategies

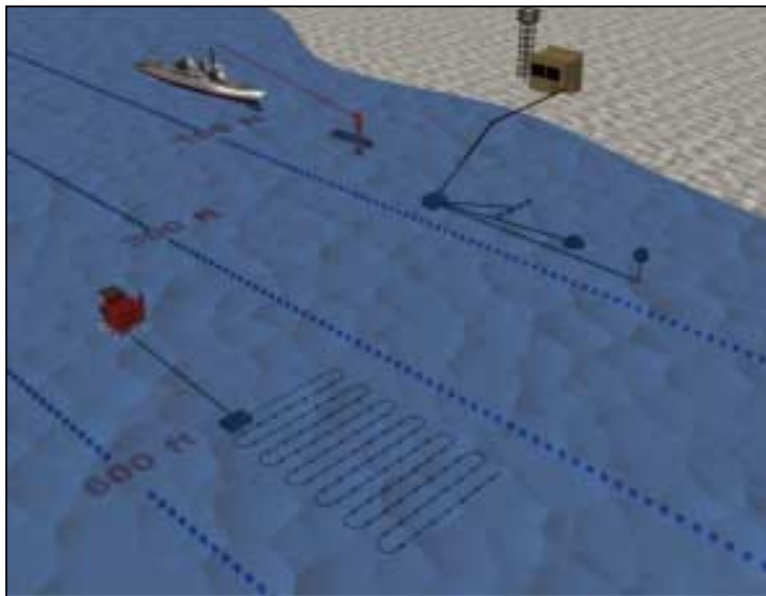
### Near Term

**Littoral Live-Fire Ranges.** Develop live-fire ranges which create a realistic littoral environment. Obtain approvals to increase explosive detonations to 4000 pounds in surf. Develop impact scoring in surf zones.

**Land/Water Drop Zones.** Develop adjacent land and water areas to permit airborne delivery of personnel and equipment. Time, space and position information on all participants will be needed.

**Shallow Underwater Tracking.** Develop initial underwater tracking capability over 200 square miles area at 60-150 foot depth. Tracking accuracy will be 5 meter minimum and have the capability to simultaneously track 6 targets.

**Surf Zone Obstacle Range.** Establish area for evaluation and experimentation of obstacle neutralization systems and techniques.



# Strategies

## Midterm

**Land Impact Area for Ship-Launched Munitions.** Complete the development of a munitions impact area adjacent to the Gulf Range. The impact area will have scoring and tracking instrumentation. Obtain approvals for explosive detonations to 8000 pounds in surf.

**Offshore Test Platform.** Establish an offshore platform for staging of vertical takeoff and rotary wing aircraft. Install instrumentation for tracking of test and training participants for effectiveness evaluations.

**Shore Landing Area for Riverine Operations.** Provide a landing area for riverine operations.

**Shallow Underwater Tracking.** Expand underwater tracking capability to 600 square miles at 30 - 200 foot depth. Tracking accuracy will be 3 meter minimum and have capability to simultaneously track 15 targets.

## Far Term

**Enhancement of Obstacle Neutralization Range.** Enhance evaluation of obstacle neutralization. The range should be reconfigurable and able to incorporate the shore obstacle's latest materials.

**Shallow Underwater Tracking.** Expand underwater tracking capability to 2000 square miles at 30 - 400 foot depth. Tracking accuracy will be 1 meter minimum and have capability to simultaneously track 30 targets.



# Strategy Integration

The Gulf Range Complex Development Objectives were arrived at by an assessment of the five planning areas within the perspective of the Vision and three Goals for the GRC. Six Development Objectives emerged that summarize the desired future capabilities. Any proposed action can be mapped back to these objectives to gain a measure of how it supports the overall vision. Therefore, we need to develop the following:

## Develop...

### Large Operating Air, Land and Sea Areas

- **Enhance Existing Test and Training Range**
  - Ensure Joint Interoperability
  - Network geographically dispersed range resources
  - Support increased data collection
  - Extend TSPI and radar to full Gulf Range
  - Re-configurable range for maximum flexibility
  - Surface surveillance
- **Expanded test and training areas**
  - Surf-zone test areas
  - Shallow-water warfare
  - Remote land impact annex

### Realistic Environments

- **Realistic Physical Systems**
  - Threats
  - Command and Control
  - Targets
  - Instrumentation
  - RF background
  - Physical environmental diversity
  - Fog of Battle
- **Realistic Digital Environment**
  - Threats
  - Targets
  - Network of systems
  - RF background
  - Linkage to real-world test and training

### Joint Test and Training Capabilities

- **Flexible Multi-Service Test and Training Scheduling System**
  - Balanced test and training priorities
  - Network of users scheduling systems
- **Interoperable Range Systems**
  - Support multi-service users
  - Minimal set-up times
  - Seamless integration of test and training
  - Fast data distribution to multi-service users
- **Integrated Experimentation**
  - In testing
  - In training
  - In joint operations

## Full Spectrum Capabilities - Digital to Operational Environment

- **Models and Simulation**
  - Vertically integrated at all levels - component to campaign
  - Horizontally integrated to real world systems
  - Verified with open air operations
- **Open-Air Testing with Simulation**
  - Testing of the future
  - Validate simulation
  - Validate system
- **Open-Air Training with Simulation**
  - Maximize training experience
  - Interconnect ranges

## Reconfigurable Capabilities

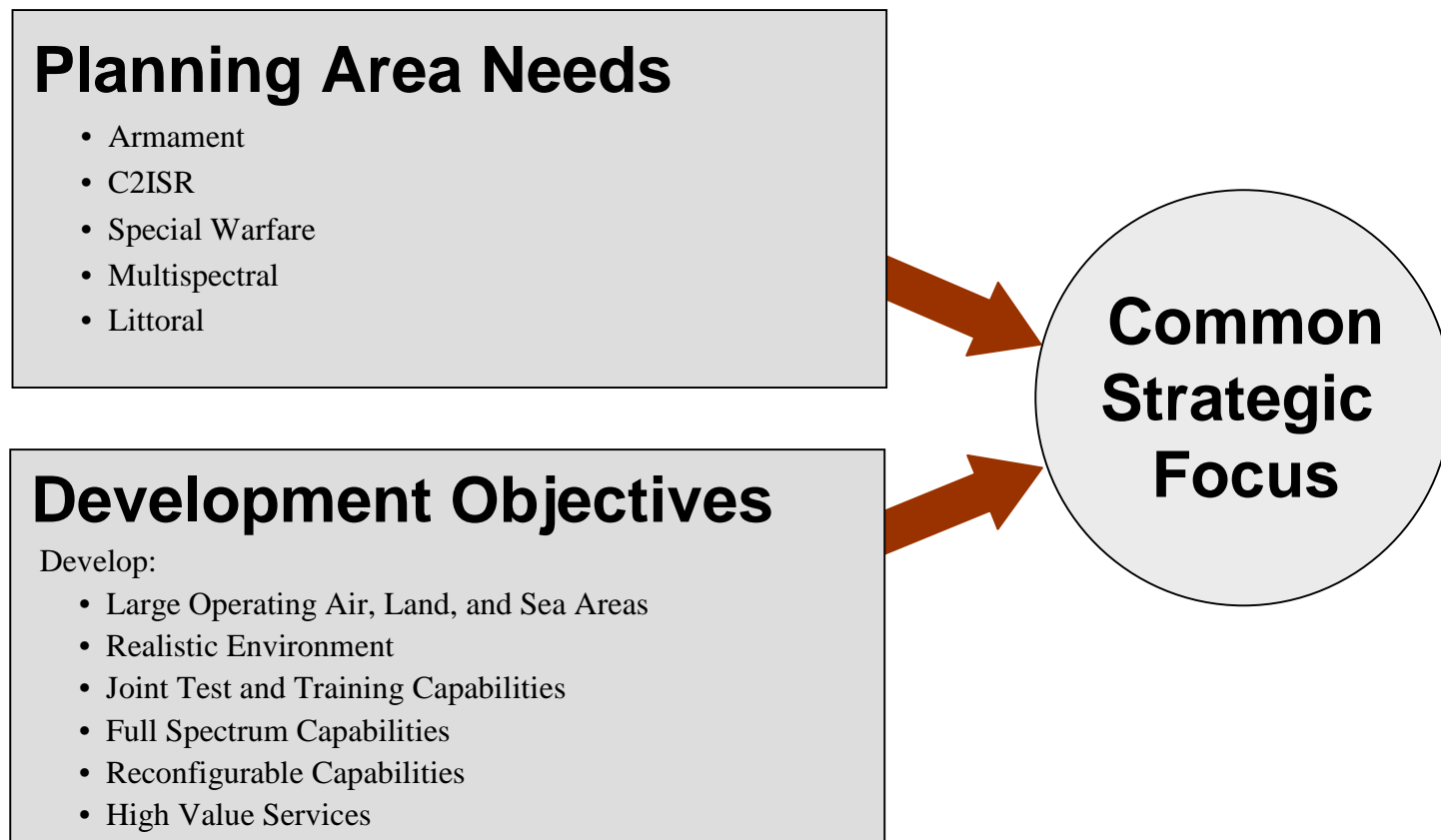
- **Capabilities Designed into Infrastructure and Systems for Rapid, Low Cost Reconfiguration**
  - Rapid upgrade of range
  - Interoperable modules across DoD
  - Seamless integration of testing and training
- **Common Test and Training Range Resources**
  - Adaptable to new technology
  - Adaptable to new tactics
  - Adaptable to joint operations

## High Value Services

- **Affordable Services**
- **Leverage Existing Capabilities**
- **Enhanced Availability**
- **Supplier of Choice**
  - Services
  - DoD
  - Allies

# Strategy Integration

In reviewing the mission area strategies, it becomes apparent there is an interconnection between the different mission areas. For example, the need for TSPI across the Complex by all participants is critical. As a result, this is a cross-cutting theme that demands a higher order perspective. To identify these cross-cutting themes, a Planning Area matrix was used against the overarching Developmental Objectives that support Goal 1.



# Planning Area Strategies

Development Objectives	Armament	C2ISR	Special Warfare	Multi-spectral	Littoral
Large Operating Air, Land and Sea Area	Tetherless Instrumentation Air Space Modifications Water-to-Land Impact Area Alt TM Bands & Equipment Programmatic Environ Assessments	Satellite Linking UAV Test Resources Tetherless Instrumentation	Integrated Maritime Spec Ops Facility Coastal Live-Fire Ranges Land/Water Drop Zones Land Impact Area Shallow Water Surf Zone Demo Area Tetherless Instrumentation	Upgrade Threat Emitters Scene Characterization Linking of C2 Infrastructure Enhancement of OAR HITL Directed Energy Countermeasures Instrumentation	Littoral Live-Fire Ranges Land/Water Drop Zones Shallow Underwater Tracking Surf Zone Obstacle Range Off-Shore Test Platform
Realistic Environment	Water-to-Land Impact Area GPS Jamming Expand, Reshape MOA's Realistic Targets	Real-Time Sensor-Shooter Test Capability	Integrated Maritime Spec Ops Facility Coastal Live-Fire Ranges Land/Water Drop Zones Land Impact Area Shallow Water Surf Zone Demo Area MOUT & CQC Areas	Upgrade Threat Emitters Scene Characterization Enhancement of OAR HITL Linking of C2 Infrastructure Directed Energy Countermeasures Instrumentation Satellite Countermeasures Instrumentation	Littoral Live-Fire Ranges Land/Water Drop Zones Shallow Underwater Tracking Land Impact Area for Ship-Launched Munitions Surf Zone Obstacle Range Shore Landing Area for Riverine Ops
Joint Test and Training Capabilities	Water-to-Land Impact Area GPS Jamming Space-Based Capabilities	Engineering Plant Link-16 Improvements Satellite Linking	Tactical Fire & Maneuver Ranges Coastal Live-Fire Ranges Land/Water Drop Zones Land Impact Area Shallow Water Surf Zone Demo Area	Upgrade Threat Emitters Scene Characterization Linking of C2 Infrastructure Enhancement of OAR HITL Target Signature Databases	Littoral Live-Fire Ranges Land/Water Drop Zones Land Impact Area for Ship-Launched Munitions Surf Zone Obstacle Range Shallow Underwater Tracking Shore Landing Area For Riverine Ops Off-Shore Test Platform
Full Spectrum Capabilities - Digital to Open-Air	Engineering Model Development Operational Ground Test Capability Real-time Model and Test & Tng Ops Environment Data Integration Realistic Targets Scene Generation	Engineering Plant C2ISR Modeling and Simulation Improvements Modernize C2 Facilities Real-Time Sensor-shooter Test Capability	Integrated Special Ops Tng Fac Integrated Maritime Spec Ops Tng Fac	Upgrade Existing Threat Emitters Enhancement of OAR HITL Satellite Countermeasure Evaluation Instrumentation Linking of C2 Infrastructure Directed Energy Countermeasures Instrumentation Satellite Countermeasures Instrumentation	Shallow Underwater Tracking
Reconfigurable Capabilities	Alternate TM Bands Adaptable Flight Termination Sys Space-Based Capabilities Expand, Reshape MOAs	C2 Test Ops Ctr Engineering Plant Modernize C2 Facilities	Tactical Fire & Maneuver Ranges MOUT and CQC Areas	Upgrade Existing Threat Emitters Linking of C2 Infrastructure Enhancement of OAR HITL High Resolution Radar Imaging Simulations Directed Energy Countermeasures Instrumentation Satellite Countermeasures Instrumentation	Littoral Live-Fire Ranges Land/Water Drop Zones Shore Landing Area for Riverine Ops Off-Shore Test Platform
High Value Services	Eng Model Development Adaptable Flight Termination Sys Programmatic Environ Assessments Space-Based Capabilities	C2ISR Modeling and Simulation Improvements Link-16 Improvements Satellite Linking UAV Test Resources	Integrated Special Ops Tng Fac Integrated Maritime Spec Ops Tng Fac Shallow Water Surf Zone Demo Area MOUT and CQC Areas	Upgrade Existing Threat Emitters Linking of C2 Infrastructure Enhancement of OAR HITL Satellite Countermeasure Evaluation Instrumentation Directed Energy Countermeasure Evaluation Instrumentation Target Signature Databases	Littoral Live-Fire Ranges Land/Water Drop Zones Land Impact Area for Ship-Launched Munitions Shore Landing Area for Riverine Ops

# Strategy Integration

From the analysis of planning areas strategies in development objective categories, ten major thrusts were identified. Six thrusts guide strategic direction, and four thrusts ensure integration of actions. Each of these thrusts need to be worked by Joint Integrated Product Teams due to their crosscutting nature. The attainment of these thrusts will therefore support the six development objectives and ultimately Goal 1 - to maximize the potential of the Joint Gulf Range Complex.

## Strategic Foci

**S-1**

### **Tetherless Instrumentation**

Develop and implement instrumentation systems for entire Gulf Range open-air (including over-the-horizon) and surface as well as under-water tracking.

**S-2**

### **System of Systems Testing & Training**

Develop infrastructure for linkage of systems to facilitate "system of systems" testing, training and experimentation. Enhanced C2 infrastructure is essential within the Gulf Range Complex and with other ranges.

**S-3**

### **Engineering Model and Simulations Development**

Develop models for munitions, C2, and simulations for training, special warfare, and multispectral warfare. Facilitize the Complex to support hybrid testing and operational ground test.

**S-4**

### **UAV Operations**

Exploit the emerging technology of UAV in weapon systems and in complex support systems. Ensure a robust infrastructure to support their operation.

**S-5**

### **Littoral & Special Warfare Operations Areas and Facilities**

Develop live-fire ranges, riverine operation areas, shore landing areas, land/water drop zones, surf zone, near-shore, off-shore and underwater ranges. Construct Integrated Maritime Spec Ops Training Facility.

**S-6**

### **Full Spectral Environment**

Provide multispectral environment in open air and by simulation to measure real-world operational effectiveness in testing, training and experimentation.

# Integration Foci

I-1

## Complex Infrastructure Technical Integration

Implement a robust and flexible Complex infrastructure system both tethered and ultimately untethered for air, land, sea and subsurface - test and training operations. Systems to be technically integrated across the complex include:

- Time-Space-Position-Information (TSPI)
- Targets
- Threats
- Control
- Communication
- Presentation and Display
- System Platform Instrumentation

I-2

## Integrated Operations

Implement an integrated complex operations system that is responsive to all users' needs to include the following:

- Complex Scheduling
- Air Traffic Control
- Complex Safety
- Frequency Control

I-3

## Planning Integration

Implement a joint plan to develop the Gulf Range Complex to meet user needs based on the integration of individual organizational plans:

- Establish Joint Planning Process
- Develop Complex Annual Five-Year Plan
  - Document Needs
  - Propose Solutions
- Obtain Joint Plan Approval

I-4

## Integrated Regional Outreach

Implement approaches to communicate the Gulf Range Complex message to the Region organizations and the public in general to include such elements as:

- Develop Standard Media Packages
  - Environmental Stewardship
  - Gulf Range Complex Mission
  - Key Operational Events
  - Issues - Noise, Encroachment
- Interact with Regional, State, and Local Entities
- Ensure Feedback to Leadership

*“To build the most effective force for 2020, we must be fully joint: Intellectually, operationally, organizationally, doctrinally and technically”*

*Joint Vision 2020*

# Organization

The best plans are useless if they do not have a structure and process to execute. The Joint Gulf Range Complex leadership, being committed to the goals and objectives established for the GRC, have formed a consortium. This does not usurp any responsibility or authority, but it does commit the partners to working jointly for the best interest of all. To attain this, the consortium has established a three-tier oversight structure and a process for periodic joint updates and course corrections.

## Structure

### GRC Flag Steering Committee

The GRC flag officers will meet annually to assess the progress in attaining the GRC goals and objectives.

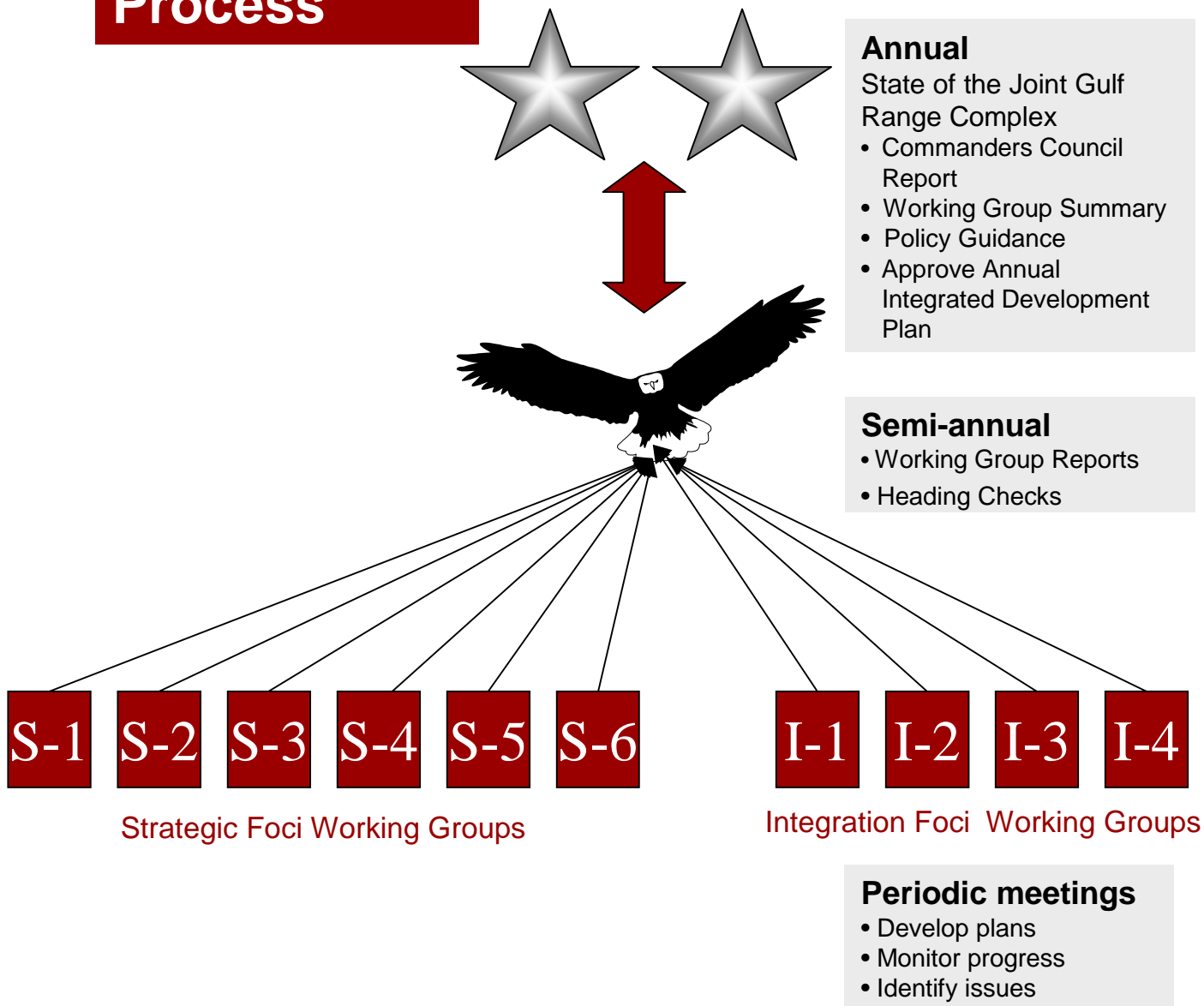
### GRC Commanders Council

The commanders of using organizations will meet semiannually to review the progress and health of the joint working groups it charters. Additionally, the GRC Commanders Council will recommend changes to working groups directions or their charters.

### GRC Working Groups

The GRC Commanders Council will charter working groups. The working groups will have an approved charter with a list of positions to be filled by using organizations. Working groups will be formed to support mission areas and special development efforts. Each working group will have a Commander as its overseer who ensures the group has a senior leader to champion their effort and provide timely oversight.

## Process



*“Range cooperatives are a natural consequence of the improvements in test and training operations resulting from increasing ability to integrate modeling and simulation into live ranges”*

*The Joint Test and Training Range Roadmap*

# Implementation

## Top Actions

### 1. Establish Joint Gulf Range Complex Oversight Structure

- Flag Officer Steering Committee
- Commanders Council

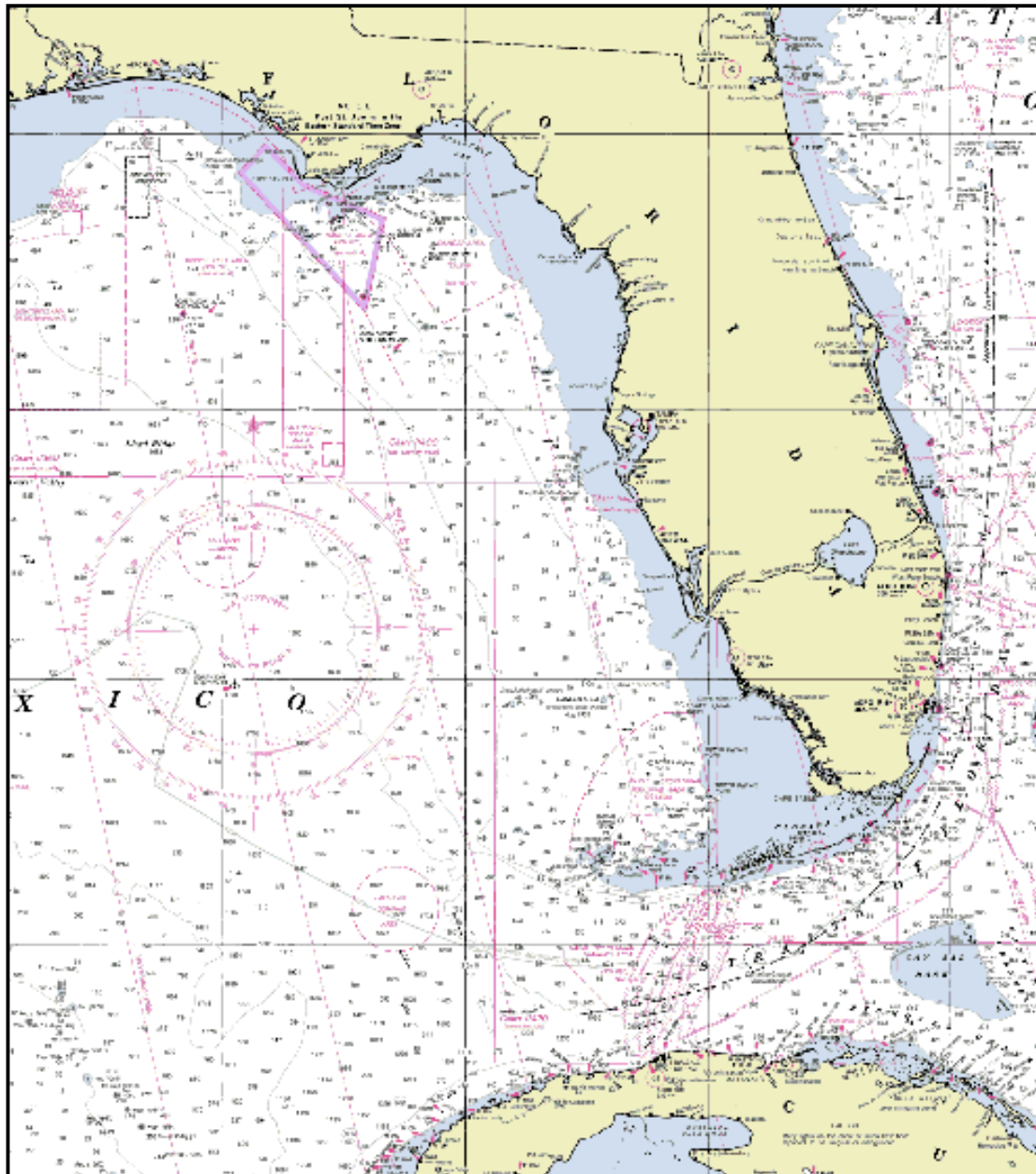
### 2. Develop a Joint Gulf Range Complex Planning Process that integrates user planning, programming and budgeting

- Establish joint working groups
- Develop joint detailed implementation plans
- Establish GRC programs supported by all users
- Develop integrated funding forecasts

### 3. Communicate the message of the Joint Gulf Range Complex

- Within DoD, ensure all services and commands understand the value of the Gulf Range Complex to DoD and potentially to their specific mission.
- Within the region, ensure that the value of the Gulf Range Complex is recognized by local, state and regional leaders and organizations.

Unsurpassed airspace, land, and sea space  
with infrastructure to support tomorrow's Warfighters



*The  
Joint Gulf  
Range Complex  
invaluable today*

*critical for  
tomorrow's  
Warfighters  
testing  
and  
training  
needs*

THE STRATEGY

# Acknowledgements

This plan was developed under the leadership of the 46th Test Wing Commander Colonel David J. Eichhorn. It is the result of a three-phase effort extending over two years managed by the 46th Test Wing Plans Office (46 TW/XP) with the invaluable support of numerous Air Force, Army, and Navy organizations and, most importantly, their making available their talented intellectual capital listed below:

## Requirements Panels - Phase I

### 0-6 Advisors - Phase I & II

**Col Stephen Pitotti - 46 TW/CV**  
Bob Arnold - 46 TW/CA  
Lt Col Larry Avery - 46 TW/XP  
Col Rosanne Bailey - AAC/WM  
Col Jeff Bell - 33 WG/OG  
Lt Col Ed Camp - 33OG/CD  
Col Chris Caravello - AAC/CV  
Kirk Dye - Navy CSS  
Don Shepherd - Navy CSS  
Roger Leete - Navy CSS  
Lt Col Steve Hildenbrandt - 53 WG/XP  
Steve Korn - AFRL/MN  
Col Marc Lindsley - AFC2TIG/CC  
Dr Dwight Polk - AFC2TIG/OA

### Counter Air

**Bran McAllister - 53 EWG**  
Jack Carey - 46 OG/OGM  
Don Setterberg - 46 OSS  
Kelly Oliver - 46 OG/OGM  
Bill Lucas - AAC/WRA  
Joe Giangrosso - ACC/WRR  
Bob McGowan - Army  
Jeff Jones - AFRL/MN  
Lt Col Paul Sutliff - 53 WEG  
Dick Chapman - 53 WEG  
Gene Wintersole - 325 OSS  
Col Tom Quelly - 325 FW/OG  
Maj Rick Vollmer - 325 FW/OG  
Lt Col Jeffery Bell - 33 FW/OG  
Maj Daniel Bronson - 33 OSS

**Champion - Col Stephen Pitotti - 46 TW/CV**

**Facilitator - Sandra Meeker - 46 TW/XP**

### Air-to-Surface

**Tom Lamonica - 46 OG/OGM**  
Mike Heard - 46 OG/OGM  
Jack Lloyd - Navy CSS  
Maj Paul Caltagirone - AFSOC/DO  
Maj Mike Gottstine - AFSOC/XP  
Rick Mook - AFRL/MN  
Maj Dave Corkum - 28 TS  
Houston Sewell - 28 TS  
John Hall - 96 CS/SC  
Breck Mixon - 96 CG/SCW

### Surface -to-Surface

**George Betz - Navy CSS**  
**Bob McGowan - Army**  
Rob Fernandez - Navy CSS  
John Auzins- Navy CSS

### C2

**Dr Dwight Polk - AFC2TIG**  
Lt Col Larry Avery - 46 TW/XP  
Capt James Baker - 46 TW/XP  
Vickie Burkett - 46 TW/XP  
Scott Chandler - Navy CSS  
Capt Mark Lilly - AFC2TIG  
Capt Parker Northrup - AFC2TIG  
Larry Greene - 96 CG/SC  
Brian Clifford - 96 CG/SCW  
Michelle White - AFRL/MN

### Multispectral

**Lt Col Phil Menthe - Army**  
**Mike Ellenberger - 53 EWG**  
Mike Heard - 46 OG/OGM  
Joe Altieri - 46 OG/OGF  
Kirk Weeks - Army  
John Brock - 46 TW/TSR  
Barnie Parker - 46 TW/TSR  
George Betz - Navy CSS  
Marc Eadie - Navy CSS  
Dr Sam Lamberts - AFRL/MN  
Lt Col Frank Karl - 36 ETS  
Capt Mark Lilly - AFC2TIG  
Richard Chapman - 53 WEG  
Maj Underhill - 53 WEG  
Paul Holt - AFOTEC

### Other Programs

**Steve Korn - AFRL/MN**  
**Bob Webb - AFRL/MN**  
Tom Sipos - 46 TW/XPP  
Kelly Oliver - 46 OG/OGM  
Bob Stovall - 46 OG/OGM  
Clarence Gooden - ACC/WRA  
Kennith Hilsop - ACC/WRA  
Mike Anspach - ACC/WMX  
Ken Davis - Navy CSS  
Shari Thomas - ARFL/XPW

### Littoral

**John Auzins - Navy CSS**  
Anthony Bond - Navy CSS  
Roger Leete - Navy CSS  
Todd Bowden - Navy CSS  
Steve Shoner - Navy CSS  
Kirk Dye - Navy CSS  
George Betz - Navy CSS  
Carl Walters - Navy CSS  
Chris Doyle - Navy CSS

## Solutions Panels - Phase II

**Champion - Col Stephen Pitotti - 46 TW/CV**

**Facilitator - Sandra Meeker - 46 TW/XP**

### Physical Environment

**Doug Nation - 46OG/CA**  
Charles Cottrell - AFRL/MN  
Dr. Jack Lloyd - Navy CSS  
Jim McLaughlin - 96 CG/SC  
Ron Higdon - 46 TW/TSR  
Walt Monteith - AAC/SEU  
SMSgt Vicmark - 53 WEG  
Russell Gunter - AAC /EMS  
Jack Carey - 46 TW/OGM

### Operational Environment

**Doug Foster - 46 TW/TS/CA**  
John Brock - 46 TW/TSR  
Jeri Ghosh - 46 TW/TSR  
Jeff Brantley - 46 TW/TSR  
Kurt Schroeder - 46 TW/TSW  
Lt Col Paul Sutliff - 53 WEG  
SMSgt Chris Vickmark - 53 WEG  
Richard Chapman - 53 WEG  
Bran Mcallister - 53 WEG  
Tom Lamonica - 46 TW/OGMT  
Billy Lucas - AAC/WRA  
Joseph Giangrosso - AAC/WRR  
Todd Bowden - Navy CSS  
Robert Webb - AFRL/MNA

### C2 Panel

**Robert Knowles - 46 TS/OGE**  
Michelle White - AFRL/MN  
Dr Dwight Polk - AFC2TIG  
Larry Greene - 96 CG/SC  
Rachel Waddell - AAC/CDE  
Maj Smith - 81 TSS/DO  
Lt Col Larry Avery - 46 TW/XP  
Capt James Baker - 46 TW/XPP  
Vicki Burkett - 46 TW/XPP  
Scott Chandler - Navy CSS

### Littoral

**John Auzins - Navy CSS**  
**Anthony Bond - Navy CSS**  
Roger Leete - Navy CSS  
Todd Bowden - Navy CSS  
Steve Shoner - Navy CSS  
Kirk Dye - Navy CSS  
George Betz - Navy CSS  
Carl Walters - Navy CSS  
Chris Doyle - Navy CSS

### Modeling & Simulation

**Dr Dyess - 46 TW/SK**  
Andy Keith - 46 TW/XPP  
Tom Lamonica - 46 OG/OGM  
Elizabeth Thorn - 46 OG/OGM  
Mike Heard - 46 OG/OGM  
Jerry Griffith - 46 TW/TSW  
Dave Schoch - 46 TW/TSW  
Larry Smith - 46 TW/TSW  
Robert Cross - 46 TW/TSW  
Richard Woodard - ACC/EN  
George Mooney - ACC/WM  
George Kirby - ACC/WR  
Roger Leete - Navy CSS  
Ronald Hunt - AFRL/MN  
Rodney Powell - AFRL/MN  
Robert Jones - 96 CS/SC  
Ron Jacob - TASC

### Special Warfare

**George Betz - Navy CSS**  
Lt Col James Smith - 16 OSS/CC  
Maj Paul Caltagirone - AFSCO/DOTA  
Lt Edoardo Naggiar - NSW CSS  
Jack Rudinsky - Chicken Little  
CWO3 Joe Lloyd - 16 OSS/DOJ  
OSCM H. McDonnell - 16 OSS/DOJ  
SMSgt W. Walter - AFSOC/DOX  
John Sieh - CQB  
Dave Dean - ADS P.C. CSS

## Final Plan Development Team - Phase III

**Champion - Jim Sirmans - 46 TW/XP**

**Facilitator - Andy Keith - 46 TW/XPP**

### Advisors

**Jim Sirmans - 46TW/XP** Doug Foster - 46 TW/TS/CA Bill Dyess - 46 TW/SK  
Doug Nation - 46OG/CA Tom Rodgers - 46 TW/TS Tom Lamonica - 46 OG/OGM

### Editors

Andy Keith - 46 TW/XPP  
Eric Beshore - 46 TW/XPE - SAIC

### Staff Support

Lynn Avant - 46 TW/XPX  
Barbara Woods - 46 TW/XPX  
Sharol Durrenberger - 46 TW/XPP  
Deborah Rich - 46 TW/XPP  
Judy Dudzik - 46 TW/XP



